Ecological Urbanism | Design Strategies for Bridging the Social Gap in Kolkata

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Ecological Urbanism
Design Strategies for Bridging the Social Gap in Kolkata
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This Final Project is presented to the Faculty of the Department of Architecture
by

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In partial fulfillment of the requirements for the Degree of Bachelor of Architecture
Kennesaw State University, Marietta, Georgia
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Thesis Project Title: Ecological Urbanism | Design Strategies for Bridging the Social Gap in Kolkata

Thesis Summary:

The city of Kolkata, in East India, exemplifies many issues that are related to overpopulation, weak enforcement of planning regulations, informal housing, natural ecological degradation, and lack of social cohesion. Meanwhile, the city stands out as one of the most important cultural centers in the country. My thesis reflects on the issues ingrained into the social and spatial conditions of Kolkata by designing a cultural and community center that brings together cultural, traditional, and vernacular identities. The site is carefully chosen at the multi-layered intersection of a wetland branch, railroad, slum, and divide between old city and new suburbs. The design springs from the charge of bringing together the old and the new, the rich and the poor, diverse social groups, and restoring the natural habitat at the edge of the city. Building upon the concept of “hybridity” proposed by Homi Bhabha, an Indian English scholar and critical theorist, the thesis explores similarities between two places to overcome the dialectic gap between natural and man-made, formal and informal, social classes, tradition and modernity.

Approved by:

Thesis Advisor: Ermal Shpuza, PhD

Thesis Coordinator: Elizabeth Martin-Malikian

Department Chair: Anthony Rizzuto, PhD
DEDICATION

This thesis book reflects hard-work and continues dedication in this long adventurous journey. This five long years of dedicated studies has led to the long awaited end to studies and has led to this point. I would have not been able to accomplish this milestone without my parents. Thank you for your constant encouragement, appreciation, and patience in my journey and being part of my accomplishments. Thank you for being there at my best and my worst times and supporting me.
ACKNOWLEDGMENT

The thesis project development and its process has been unique. Throughout the thesis process, many people had a significant part in helping me reach this goal. I would like to thank professor Ermal Shpuza, as my thesis advisor, has been guiding me through thesis process. Also, I would like to thank all my professors at KSU for helping me gain skills and knowledge to be able to accomplish this project. Lastly, I would like to thank my friends, who have created such an exciting and positive influence around me to keep me dedicated to finish the thesis project.
Kolkata, India, also known as a “City of Joy” for its vibrant diversity and as one of the most important cultural centers in country, exemplifies many issues that are related to overpopulation, weak enforcement of planning regulations, informal housing, natural ecological degradation, and lack of social cohesion. The development of modernized neighborhoods in the outskirts coincided with the internal migration of the middle class and furthered the social gap. Wetlands east of the city, which used to provide a substantial amount of food and livelihood for the city, have been diminishing due to urban development. The lack of necessities and services have caused a spatial divide whereby slums and homeless population have overtaken the natural ecosystem making Kolkata the second most polluted metropolis in India. The thesis springs from the charge of bringing together the old and the new, the rich and the poor, the diverse social groups, while restoring the natural habitat at the edge of the city. Building upon the concept of “hybridity” proposed by Homi Bhabha, an Indian English scholar, and critical theorist, the thesis explores similarities between two places to overcome the dialectic gap between natural and man-made, formal and informal, social classes, tradition, and modernity. The thesis reflects on the issues ingrained into the social and spatial conditions of Kolkata by reforming the urban ecology of Circular Canal which connects the Hooghly river to the wetlands and links the inner city to the newer modern suburbs. This waterway has been neglected over the years, now is polluted and its banks are covered by slums. The thesis employs urban ecology strategies to restore the natural habitat of the canal while weaving it in social activities of bazaars, parks, step wells for religious and cultural ceremonies while providing new housing for those displaced. The design re-links the waterways and the street network between two parts of the city. The design uses local material and building techniques, and native plants for the canal slopes while employing the vernacular step wells to reignite the connection of people with the water.
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1.0 DESIGN THEOREM
1.1 THESIS STATEMENT

The thesis approaches the issue of social gap in Kolkata with a notion of “hybridity.” The concept of hybridity exemplifies the issues by exploring similarities between two places in order to overcome the dialectic gap between natural and man-made, formal and informal, social classes, tradition, and modernity.

The thesis argues that the ecological restoration of a polluted canal in the center of the city will not only restore the natural habitat of the wetlands but will also create a much-needed nexus of interaction among various social groups through cultural events, markets and parks.

Kolkata, a city in East India, is also known as a “City of Joy” for its vibrant diversity and as one of the most important cultural centers in country. It exemplifies many issues that are related to overpopulation, weak enforcement of planning regulations, informal housing, natural ecological degradation, and lack of social cohesion.

The staggered and disproportioned urban mapping signifies those issues by displacing the social and spatial conditions and creating different typological thresholds. The development of modernized neighborhoods in the outskirts coincided with the internal migration of the middle class and furthered the disconnect between generations.
The lack of basic necessities and services cause spatial shift in the city as slums and homeless population increases, as per 2011 census it is estimated that more than 1.5 million people live in slums and 70,000 are homeless, they make up 22 percent of the Kolkata’s population and have lasting impact on the city. Kolkata was built on sole basis of serving as port and industrial zone by the British, over time it has led to it being the 2nd most polluted metropolis in India, according to the World Health Organization.

The site will emphasize on the specific issues and approaches to help mitigate them through the concept of “Hybridity.”

The thesis research looks at the issues ingrained into the social and spatial conditions of Kolkata by designing a cultural and community center that brings together 1) cultural, 2) traditional, and 3) vernacular identities. My design will express the importance of diversity, equity, accessibility, and preservation, by framing a space to construct and reproduce power relations between the people and the environment. In doing this my aim is to help mitigate socio-spatial displacement. Socio-Spatial displacement addresses the lack of interaction between built infrastructure and society by emphasizing the meaningful connection with people through semiotics.
RELEVANCE OF THESIS

Kolkata presents with diverse and significant ideology based on the typological placement and formation of the city overtime. The site is located at the central rail junction, Sealdah Train Station. Sealdah train station is the central node of the rail system, which extends throughout the city and further. The site also has canal which connects the wetlands with the Hooghly River. It helps us understand waterways of the city. The land usage of and around the site is mixed and diverse, with majority being residential and industrial areas. The diverse yet disproportioned urban mapping of the city has caused it to misappropriate its commodities provided to the people.

As many other places in India, the city is a cultural hub, buzzing with activities that binds people together, thus forming such an unique identity that defines the city. The urban developments pushing forth modernization is helping the city be with other developed countries, but its causing rift between Kolkata's identity, the roots of kolkata, the people, culture, tradition, and beliefs.

Kolkata’s interconnected ideology formed through unique groups of people with their specific beliefs, culture, and tradition is being blurred by the continuous modernized developments as well as the technological and generation gap between the old and young.
Kolkata becomes unique and different from others by focusing on their deeply rooted ideology, so it is important to resurface and become aware of those ideologies to the ever-changing City of Joy. I will be focusing on the identities of Kolkata, identities such as their

(1) Cultural
(2) Traditional
(3) Vernacular
to help frame the built form, which represents Kolkata’s identity. It becomes important to express the significance of diversity, equity, accessibility, and preservation, by framing a space to construct and reproduce power relations between the people and the environment.

While there is hidden struggle to grasp the ideologies, Kolkata has many other issues as it struggles with natural ecological degradation such as their typological geography as the city is located on a basin with high level risk of flood. The city is suffers through many other issues due inequality between social classes. The city flood management is struggling to be aware of and prepare for such natural disasters. City and the people should be able to better prepare for such disasters.

To better understand issues I will be focusing on Kolkata’s identity, issue of poverty (slums and homeless), wetlands (usage and preservation), and pollution (history of industrial era).
IDENTITY
Modernization, generation gap, and diversified city is leading to displaced identity of individual.

Cultural and traditional values are being blurred by the modernization of the city.

Newer generation's approach to their cultural identity differs from their elders, thus creating a gap.

Kolkata's history defines the unique vernacular architecture formed through their cultural integration and diversified people of the city.

POVERTY
About 22% of the Kolkata's population is either homeless or lives in slums.

Slums spread throughout the city, near waterways, and along train tracks. As per 2011 census, there area around 1.5 million people living in slums.

Homelessness in Kolkata shows the lack of humanity and separation of social values. As per 2011 census, there were around 70,000 homeless people around Kolkata.

WETLAND
Urbanization of New Kolkata has caused the reduction in wetlands.

Kolkata’s commitment to modernize the city is destroying the wetland.

Wetland has been and still is an important source of water, 30-50% of food and livelihood for more than 30,000 people.

Environmental organizations has been pressuring the city to preserve the wetlands.

POLLUTION
Unhygienic living, industrial waste, man-made garbage polluted the waterways.

Kolkata is ranked the 2nd worst polluted metropolis in India by World Health Organizations.

Rise in vehicle usage, industrial activities, and biomass burning led to such drastic pollution rise.

Lack of recycling, inequality between different social and spatial conditions increases the rate of pollution.
The Concept of Hybridity was established by Homi K. Bhabha, an Indian English scholar and critical theorist. He introduced the concept in his book, “The Location of Culture”, and it is based on how people were able to form a society during the colonizations, hence it is one of most widely employed and most disputed term in post-colonial theory. Hybridity commonly refers to the creation of new transcultural forms within the contact zone produced by colonization. Hybridization takes many forms: linguistic, cultural, political, racial, etc. Linguistic examples include pidgin and creole languages, and these echo the foundational use of the term by the linguist and cultural theorist Mikhail Bakhtin, who used it to suggest the disruptive and transfiguring power of multi-vocal language situations and, by extension, of multi-vocal narratives.\(^{(1)}\)

The concept of Hybridity can be extrapolated to perform as formation of interconnected system to help bring together people with differences, because of their cultural or traditional differences, beliefs, or ideologies. In current times, the main reason of differences is technology, modernization, urbanization, disparity within the social classes, and typological changes.

\(^{(1)}\) See Mambrol, “Homi Bhabha’s Concept of Hybridity.” literariness.org/2016/04/08/homi-bhabhas-concept-of-hybridity/.
The notion of mediating built forms based on its meaning and influences to help frame a space goes back to my thesis idea about how different, yet uniquely combined, groups influence and affect other and the surrounding spaces to conform the built form based on those influences. We form a bubble of spatial conditions and beliefs that we unintentionally frame the spaces we are comfortable with the most. As my thesis focus is on social and spatial displacement, I can take the three primary focuses of the concept, analyzing the spatial structure, the interpretation of constructed meanings, and the interpretation of lived experience, in the design process and research investigation. (1)

Kim Dovey experiments with theories which describes such notion by drawing from a broad range of social theories and deploys three primary analyses of built form, namely the analysis of spatial structure, the interpretation of constructed meanings and the interpretation of lived experience. These approaches, to program, text and place, are woven together through a series of narratives on specific places and types of built environment, such as Berlin, Beijing and Canberra. (2)
River Literacy

Dilip da Cunha raises a unique perspective about the formation of a river and says “Separating land from water on the earth surface is one of the most fundamental and enduring acts in the understanding and design of human habitation. The line with which this separation is imaged on maps, etched in the imagination and enforced on the ground with regulations and constructions has not only survived centuries of rains and storms to become a taken for granted presence on the earth surface; it has also been naturalized in the coastline, the riverbank, and the water’s edge. These are places subjected to artistic representations, scientific inquiry, infrastructural engineering, and landscape design with little attention to the act of separation that brought them into being. Today, however, with the increasing frequency of flood and sea level rise attributed to climate change, the line separating land and water has come into sharp focus with proposals for walls, levees, ‘natural defenses’, pumps, land retirement schemes and proposals for ‘retreat’. These responses raise questions on where the line is drawn; but they also raise questions on the separation that this line facilitates.”

River represents a natural formation of a land, land does not decide where it should flow, but the water decides its own path. A simple river can affect how a civilization has formed and been ruined, it can change its course, decide its connection to land and its edge. It creates a natural design in which it has similar qualities as we input in our design of a structure or a building. Such qualities are its unique formation, its control on its own flow and path, and becomes a node to help human prosper.
“Architecture is a manifestation and expression of culture. As such it must acknowledge and respond to the cultural needs and values of the society with which it interacts. Consequently, a selected set of cultural aspects will be defined which have been found most likely to influence architectural form.”

The best way to know about a city is to ask someone has been living there their whole life. “It is fun to explore the culture of Kolkata India. Over here, the days begin with a cup of tea and thereafter people leave from their houses to enjoy the morning breeze. They carry out their fitness workout consisting of walking, jogging, stretching etc. Bengal offers a mind-blowing variety of sweets and yummy mouthwatering dishes. Kolkata is truly a city of talent and passion, where people are lively and have an enthusiasm to live life to the fullest. If you want to get well versed with the Kolkata culture, the best way is to look out for a friend over there and join adda i.e. the local parlance where chat sessions are held. Discussions take place on a wide variety of subjects ranging from politics, sports, religion, news, books, art, films, music, food etc. The discussions are healthy and never end with arguments or an ugly note.”

[Links to related articles and figures]
“Traditional architecture is that way of building which makes serious use of the familiar symbolic forms of a particular culture of a particular people in a particular place.”

Bengali’s are very fond of music. In fact, if you go about visiting houses in the neighborhood, you’ll find that there is an aspiring singer in almost every home. Bengali’s love to indulge in yummy food. In fact, every meal ends up with some delicious dessert. For people who love eating junk food, Calcutta is just an apt place. Festivities are an integral part of the city. Calcutta hosts a variety of fairs, film fest, music conferences and folk fairs. It houses the Marwaris, Parsis, Anglo Indians, Jews, Armenians and the joyous people of Chinatown. Kolkata has a plethora of tourist attraction places encompassing museums, galleries, heritage buildings, amusement parks, temples, churches and synagogues.”

https://artscolumbia.org/applied-arts/architecture/modern-architecture-and-traditional-architecture-5887/
“Vernacular architecture is an architectural style that is designed based on local needs, availability of construction materials and reflecting local traditions.”

When it comes to constructing a house or a building, the locals would always prefer brick, cement, mud, mix of dung (one of the oldest way to make huts), or local woods. Now this types of materials would build a house that is very simple style. Old houses would use brick and cement combined to make the necessary living accommodation for people to live based on the amount they can spend on it.

Kolkata’s architecture has beautiful and unique combination of styles. As history shows the influence of British Kingdom on Kolkata earlier on as they constructed a city in the name of Queen Elizabeth to establish their ground in India. The architecture styles of the earlier houses and buildings relies heavily on British architecture style during such time. As the city evolved, the local architecture style became more prominent. The use of color, curves, and detailing of each houses is very intricate. It reflects their culture, ethnicity, and
The thesis focuses on the urban disconnection through the means of social and spatial displacement occurring in Kolkata. Several factors drive the displacement and worsen the situations in relation to the people, places, and area. Kolkata is a city built around wetlands, water reserves, which acts as a filtration system for the city and its people, but man-made physical alterations made to the city have created boundaries and thresholds that separate the city. These thresholds consist of canals, roads, and other natural and man-made aspects in the city. The project focuses on the concept of hybridity, its a notion in which it represents bringing together two different ideologies, beliefs, individuals, or groups. Using the concept, it will be possible to interpret the displacement occurring in the city, by focusing on the spatial and social conditions, as well as the connections between the multi-cultural and diverse influence which affects the way people interact and live everyday life.
Renzo Piano’s objective was to solicit ideas for a center that would celebrate the Kanak culture native to New Caledonia, and in the process, smooth over ethnic tensions that had been chronically deteriorating between the Kanak people and the island’s other inhabitants. That it would orchestrate an international talent search to recognize its local culture was a source of irony and criticism, made even more poignant by the historically strained relationship between the Kanaks and the ever-encroaching influence of modernization.

**Issues:**
+ Mitigate ethnic tensions
+ Helps modernize Kanaks (natives)
+ Peace between natives and settlers.
+ Rekindle cultural identity, traditional ideology, and vernacular architecture.
+ Usage of local material, convergence of different ethnic groups on the island, and show the hard work of their ancestors to strengthen their roots. The design also expresses the surrounding areas forms with the progression of the island’s growth and people’s acceptance to the outside world.

**Relation to Thesis:**
+ Helps mitigate the issues raised in the city using a cultural, ethnic, and vernacular architecture approaches.
+ Aspects accounted for:
  - Traditional
  - Cultural
  - Vernacular

Localization & Vernacular Design

Sustainable Building

Built based on Needs of People

Site Surrounding & Site Placement

Local Material & Environment Friendly

Site Surrounding & Site Placement

Localization & Vernacular Design

Sustainable Building

Built based on Needs of People
Tejorling Radiance Temple

Based on the simplicity of the form, it is not build to catch one’s attention but to only serve its purpose, and that is to become a spiritual ground for the locals. The materials seems to reflects the mood of the area with the usage of simple local brick walls, in order to contrast against the green farms the temple has its own unique color.

Design Process + Concept:
+ Hindu & Historical aspects re-interpretated in a contemporary ways.
+ Religious Architecture
+ Traditional
+ Vernacular
+ Locality
+ Modern
+ Temple Layering
+ Meditation | Prayer Space
+ Sustainable
+ Natural Usage

Figure 1.29 Figure 1.30 Figure 1.31

Vernacular/Spatial Living
Local Material & Environment Friendly
Religious Space Cultural Space
Sustainable Building
Built based on Needs of People
The Temple And The People- Sai Mandir

Spatial Quality:
The initial idea was to create a perforated periphery (Jali) that would act as an enclosure as well as facilitate the flow of space from the exterior to the interior, with the locally available “tandoor” stone. (Vernacular Material)

Vernacular Material:
The stone was then abandoned for structural stability and durability concerns and replaced with extruded hollow clay bricks that provided a rich contrast of warm brick red against a backdrop of cool gray tandoor stone and a strong connection to the earth.

Design:
The perforated screen then took on a life of its own brought about by an intricate play of rhythms and transformations using the simple geometry of the modular brick to create intricate forms that echoed the traditional profiles of the temples.

People/Locals:
The design and the construction of the temple took an all-new meaning when the entire village came and participated in animated discussions on the form and wondered and questioned and fed and feted the architect. The energy this process generated is reflected in the building and its success as a space that brings the people together.

Optimal design patterns of bricks to let light and wind in as well as block it when necessary.

The circulating space is designed based on procession of prayer.

Centralized Temple helps bring the people and the town together.
Shyam Farm Forest Resort

Design Aspects:
+ Historical Style
+ Local Influence
+ Traditional House Style
+ Spatial Qualities
  - Light Movement
  - Public/Private Space
  - Scale Differences
  - Blending with Nature
+ Ecological Sensitive notion
+ Sustainable Aspects
+ Natural Materiality
+ Circular Circulation
+ Vegetation Awareness

• Spaces move from light to dark, hot to cool, public to private – reflected through variations in scale & proportion which offer an intriguing spatial experiences.
• The bold construction of the resort provides a sense of security but still exposes users to the exhilarating natural setting. Indeed, the experience of wilderness overrules formal gestures; in hopes of seeing nature fight its way back. Cottages are built with clay-tiled roofs and exposed bricks that will gradually get covered in radiant moss. Sun, rain and wind will also pierce their way through the property, it brings humbling awareness of one’s place in the world.
• An essential feature of the design is its ecologically sensitive notion of ‘gently embracing nature’. the cottages are ‘planted’ among the old trees without disrupting the natural setting. The shyam farm forest resort is a testimony to the long-lost respect towards nature, and the desire to preserve local customs that shape the identity of the region.

Layered Circular Pattern

Pierced Through Light

Arched Window Brick

Site Surrounding & Site Placement

Local Material & Environment Friendly

Localization & Vernacular Design

Sustainable Building

Built based on Needs of People

Figure 1.45
Mahaprasthanam | Hindu Crematorium & Cemetery in India

**Design Process:**
Process consists of the final stage of life, divided into five design parts:
+ Preparation
+ Cremation
+ Mourning
+ Purification
+ Commemoration

**Design Aspects:**
+ Structural Relation
+ Symbolism
+ Natural Procession/Continuity
+ Modernism
+ Traditional
+ Ritualistic
+ Religious

The procession of thoughts and ideology inserted in this design reflects the beliefs and ritual Hinduism follow to release the dead into the afterlife. The way those phases has been created in design to make people feel each of the notion as they proceed forward. The simple material usage signifies the importance of the space and program rather than the material attention, because it has been said that people should give up all they have earned (money, gold, house, good/bad) in their life in order to fully be released into afterlife.

Humans Belief and Water Integration

Preservation & Restoration

Cultural and Religious

Sustaining a life source

Figure 1.50
Tanpo Solar School | Ladakh, India

Design Process & Aspects:
+ Transparency | Locality
+ Opening in relation to site
+ Materiality | Locality
+ Site connection
+ Movement | View
+ Structural capability

The main architectural challenge was to provide a viable environment without burning fossil fuel in the Himalayan winter, for education purposes. Probably due to the small percentage of the ladakhi population inside India, no Ladakh-specific school standard plan has been developed for the region, the same buildings are being built like on lower altitude areas of Jammu & Kashmir. These buildings, lacking heating and insulation, are not suitable for winter use at 3800 meters altitude above sea level. Thus the Himalayan region suffers from a forced winter break lasting 3 months.(1)

One of the element which made the project interesting was the use of the local material to not only lower the cost, but also to educate the locals about the abundance in material to construct more buildings to improve their living condition and their community. The notion of localization is an important aspect of design and it would make a useful impact in my thesis project.

Localization & Vernacular Design

Sustainable Building

Built based on Needs of People

Site Surrounding & Site Placement

Local Material & Environment Friendly

Natural Rock Flooring

Wood Beam Structure

Natural Formed Roof

Unfurnished Natural Wood

Clay+Cement Wall

Natural Rock Flooring
River Development | Ganges

Design Process & Aspects:
+ Cultural Rejuvenation
+ Opening in relation to site | Site connection
+ Materiality | Locality | Structural capability
+ Movement | View

The main architectural challenge was to ensure effective abatement of the river’s pollution and to conserve and rejuvenate it. (1) This project touches the aspect of my thesis focus ideas in which I want to focus on the Kolkata City’s cultural, spiritual, and vernacular aspects. The way they designed each of the ghats based on the site context shows how much the designer became part of the site and how meaningful and spiritual this project was to them. I believe that they personally felt touched and connected to the pure process of meditation in the Ganges. The site that I will choose would be conformed to frame a form that will fit according to Kolkata’s identity. The firm developed their design with the ultimate goal of becoming one with the river—closing the circle of life around the Ganges through the sensitive coexistence of a varied program.

River Front Relation to Water

Cultural Relation to stepped down process of people into the river

Materiality used based on local and vernacular settings

Different Programmatic Spaces
Religious Space | Cultural Entity
Meditation | Prayer Spatial
Pedestrian Paths

Religious Space | Cultural Entity

Pedestrian Paths

Humans Belief and Water Integration

Preservation & Restoration

Cultural and Religious

Sustaining a life source

Figure 1.66
Figure 1.67
Figure 1.68
Figure 1.69
Figure 1.70
Figure 1.71
RiverCity Gothenburg

Strategies
Connect The City | Embrace The Water | Reinforce the Centre

RiverCity Gothenburg is open – inwards towards Gothenburg and West Sweden – and outwards to the world. It is a meeting point for old and new, the known and the unknown. In the city, people feel a strong sense of community feeling and there is always a new initiative around the corner. The area is alive and open and at the same time unique and special.

Strengths
Water | Export/Shipyard | Industry/commerce | Demand/Economy

Challenges
Social Exclusion | Climate Change | Changed Economy

Approach
Openness | Collaboration | Development | Inter-Connect | Reinforce | Ethos | Sustainable | Inclusive | Diversity | Public | Flexibility | Green | Energy | Renewable

Embrace the Water

THE CITY IS CONNECTED BY STRATEGIC LINKS ACROSS THE RIVER

a. An urban area between Mølleparken and the Central Station area

b. A bridge for pedestrians and cyclists to Frimurere as an extension of the streets of Østra Hamn- gatan and Ävenyn

c. A public transport route that increases capacity and reduces congestion between Sjöbergsvägen and the Linnégatan area

d. A public transport route that connects the areas of Rinön and Kullavägen towards Söderåsenvägen

ACTIVITIES AND URBAN PATHS ALONG, BESIDE AND IN THE WATER

Water should be seen as an asset in the urban environment.

It should be easy and attractive to move across and along the river.

THE INNER CITY WILL GROW ACROSS AND ALONG THE RIVER

The RiverCity Gothenburg area should be characterized as a vibrant urban space, built on the principles of the compact city. The quarters of the inner city should expand across the river.

Figure 1.73
Figure 1.74
Figure 1.75
Figure 1.76
Figure 1.77
Figure 1.78

+Creating a city for all
+Building the city together
+Getting people involved
+Creating a living river space
+Making it easy to live sustainably
+Using climate adaptation as a driving force
+Releasing the driving forces
+Allowing the regional center to come closer
+Creating an attractive urban environment

Investigate through Interaction
Preservation & Restoration Unifies
Programmatic Framework Design
Connection to Society
Built based on Needs of People
Madrid Rio Urban Waterfront Park

Madrid Rio is a huge recreational and cultural area both for its landmarks and leisure facilities and the culture it houses, and for being a reference point from which to contemplate and come into contact with monumental Madrid.

From the playful viewpoint of the new system on the bank of the Manzanares, it provides the perfect recipe for a good time with family. Children will have fun in the 17 play areas found along the Salón de Pinos, all with swings made from sustainable, natural materials such as wood and hemp rope, forming webs, hammocks, hanging bridges or climbing vines. Each zone has different characteristics according to age, so there are areas dedicated for younger and older children based on skill, balance and strength.

But it is also a place where adults can enjoy a great cultural offering. For all cultural activities (exhibitions, music festivals, theatre ...) that are held in Matadero Madrid, you pass by new bridges and beautifully constructed bridges. In Madrid Rio there is also the Puente del Rey, where the Spanish football team celebrated its victory in the South Africa World Cup in 2010.

Approach
Openness
Inter-Connect
Reinforce
Sustainable
Inclusive | Diversity
Public | Flexibility
Green | Energy
Preservation
Reclamation
Restoration
Programmatic Framework Design

Connection to Society

Built based on Needs of People

Preservation & Restoration Unifies

Relation to Surrounding

Unique Programmatic Spaces

Threshold | Fabric of the City

Reclamation of Nature

Green Linear Park

Pedestrian Path

Constricted Waterfront

Stepped Water Front

Integrated Bridges

Figure 1.83

Figure 1.84

Figure 1.85

Figure 1.86

Figure 1.87

Figure 1.88

Figure 1.89

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2.1 SITE | CONTEXT

Kolkata, West Bengal, India
Kolkata, a city located in East India and also serves as the capital of the West Bengal state. It is located in the basins of the Bay of Bengal and the city is established along the Hooghly river and is growing significantly.
2.2 Kolkata’s History

The urban layout of the city signifies its history, struggles, progression, expansion, development, and disruption. The staggering growth of the city has caused a positive and negative impact to people and the urban land. Kolkata was properly established and designed by the British ruling India during that time. The socially stratified and spatially overflowing city is being pushed to its brink of its edges as the people and the city struggles to deal with several issues. Kolkata, a city that grew from small village settlement near the Hooghly river, was built by the British during the 1750’s. The urban growth of the was constrained by the restricted growth of the strict rules under the British. Kolkata, also known as Calcutta by the British, served as the capital of British India for several decades as it was center for export and imports of major goods.
Kolkata’s History

1686
Calcutta, the city of joy was established in the year 1686. Consisted of small villages: Sultanat, Govindpur, & Kolkata

1756
Siraj Ud-Daula (Nawab of Bengal) drove British away from the town.

1757
Battle of Plassey occurred, in which Robert Clive defeated Nawab and took over the town.

1774
Establishment of Supreme Court, Calcutta became a base of justice.

Between this period, the growing seeds of nationalism within the people became evident, as people stood against Lord Curzon’s plan regarding the partition of Bengal. Rabindranath Tagore led the nationalist anti partition movements. The Partition was repealed in 1911, followed by the shifting of capital of India from Calcutta to New Delhi.

2011
Calcutta was officially renamed Kolkata.

Figure 2.9

Figure 2.10

Figure 2.11

Figure 2.12

Figure 2.13

Figure 2.14
2.3 City as a Whole

Figure 2.15
Urban Extent

The Urban Extent of Kolkata in 2014 was 96,868 hectares, increasing at an average annual rate of 4.7% since 2003. The urban extent in 2003 was 59,600 hectares, increasing at an average annual rate of 4.9% since 1990.
Kolkata’s Urban Growth

- Kolkata’s urban growth can be seen in the map on the left, it clearly shows that the city grew in correlation with the river edge and it developed from the edge to inland.
- The Hooghly River played a key role in establishing the towns and cities back in the 19th century.
- The growth parallel to the river also signifies its importance based on natural resources for the people.
- The exponential growth which occured in late 1990’s and is contuing to this day has tripled the land covered by people for habitation.
- The urban growth is exhausting the natural resources in the areas, leading to significant ecological degradation within the urban spaces as well as its surrounding.
Circular Canal | Site Conditions

1) Circular Canal is the only canal to go through the city
2) It connects the Hooghly River to the Wetlands of Kolkata
3) Slope of the Kolkata is eastward, towards Salt Lake
4) Canal dries up in summer, leaving behind clogged dirt and garbage.
5) The first steam-powered lock gates were constructed at the mouth of the canal.
6) Flooding occurs due to lack of proper usage of Circular Canal.
7) Water-logging on streets: Water-logging is synonymous with the monsoon in Kolkata and many other major Indian cities. It occurs due to misconstruction of drainage system of Kolkata during British rule.
8) Purpose of the canal was as a drainage system for the city, but misconstruction led to it creating more issues than resolving them.

CANAL ACTS AS A FABRIC BETWEEN OLD KOLKATA AND THE NEW KOLKATA
Issues of Circular Canal

Canal still lets water pass by but cannot control water surges from the river during monsoon season.

Homeless population have taken over the edges and the slopes of the canal as living space.

Ecological degradation of the canal and surrounding spaces.

People throwing the garbage into the canal has made the situation worse.

Temporary living or Slums exists on the slopes of the canal due to over population. They are staggered through the length of the canal. People living on the slopes suffers due to polluted water, waterlogging of garbage, and flooding.
Urban Connection
Circular Canal | Existing Conditions

Canal separations
Crossings of Roads
Abundant active spaces
Secondary road bridge
Active pedestrian area
Vehicular Bridge
Lack of Pedestrian movement
Industrial Zone

Possibility of creating a pedestrian area

Figure 2.26
Urban Ecological Reformation in Kolkata

CIRCULAR CANAL
+ Central Waterway Connecting & separating the Old Kolkata and New Kolkata
+ Below sea level elevation in relation to the city
+ Slope of the Kolkata is eastward, towards Salt Lake
+ Canal dries up in summer, leaving behind dredged dirt and garbage
+ The first steam-powered lock gates were constructed at the mouth of the canal
+ Circular Canal is abandoned, thus causes floods.
+ Waterlogging on streets: It occurs due to misconstruction of drainage system of Kolkata during British rule.
+ An invert-invert fitting, on the other hand, does not provide that extra room, which leads to overflow and flooding.

The Kolkata Wetlands are world’s only fully functional organic sewage management system and can be described as the kidneys of the city.
Site Macro Analysis

Existing Land Use

- Residential
- Industrial
- Commercial
- Health & Wellness
- Parks
- Burial Grounds
- Railway Tracks
- Tram Tracks
- Pedestrian Path
- Hospitals
- Religious Spaces
- Road Hierarchy

Proposed site is spread for 5.5 miles (+/-) and travels through the city. Since the canal is formed to connect and process water from within city sewers and drains into the Hooghly river and/or the wetlands, it becomes the processor which squeezes out the water into the river or the wetlands and keeps the waste in it. The lack of proper usage of the canal has also led to it being improperly maintained, thus the central vein of the city has become clogged.

Sealdah Railway Station is the central nervous system of the Kolkata Railway.

Industrial Zones are usually in relation to the Railway Tracks.

Housing is taking over the water reserves and shrinking green spaces.
Access | Usage

**PROS**
- Bridges and Crossing: 17
- Railway | Highway | Road Bridges
- Creates numerous connection to both sides
- Easy access for vehicles, trains, trams

**CONS**
- Way to many bridges than necessary
- Unused local bridges
- Over-exhausting and covering the canal
- No Pedestrian Bridges
- Some bridges can be taken away and arterial connection would still be preserved
- Canal has hidden under such overemphasized bridges which made the canal redundant
- Abandoned the canal
- Lack of maintenance
- Unprepared for flooding or any other natural events.

**DESIGN PROGRAM APPROACH**
- Pedestrian Paths
- Pedestrian Bridges
- Reclaimed Old Bridges
- Restoration of Ecology in Canal
- People’s Connection to and across the Canal
- Bring Cultural and Traditional Programs and Ideology to Design
- Reconnect The Urban Layout
- Integrate the Spatial and social Conditions of the Canal and the surrounding
- Strengthen the Threshold of the city through Circular Canal
- Re-evaluate the accessibility of the canal to the rest of the city, the people, and the water.
2.4 WATER AS A LIFE

Flood Prone City

Sea Level Rise

1993 - Present

3.2 mm/year

86 mm/year

Kolkata, India

Guangzhou, China

Shenzen, China

Tianjin, China

Chennai, India

Surat, India

Mumbai, India

Abidjan, Ivory Coast

Tampa, Florida

Miami, Florida

New Orleans, La

New York City, NY

Boston, Mass.

Figure 2.29

WATER AS A LIFE

Guayaquil, Ecuador

3.2 mm/year

86 mm/year
Kolkata is located at the edge of the Hooghly river. The waterways which are naturally formed from the Bay of Bengal, located in the south of Kolkata. The waterways connects in several ways and forms different form of water source, such as the wetlands in the East of the city. Kolkata was built around the basis of the formation of waterways, to help with transportation of goods in the early 19th century, and necessary aspects for the economical growth are situated on the edges near the water.
East Kolkata Wetlands (EKW), the world’s only fully functional organic sewage management system. As for the East Kolkata Wetlands, this unique ecosystem impacts the daily lives of people in Kolkata and in the region in several ways. If the Maidan is the lungs of Kolkata, the East Kolkata Wetlands may well be described as the kidneys of the city. Originally a patchwork of low-lying salt marshes and silted-up rivers, East Kolkata Wetlands is a vast network of man-made wetlands bordered by green embankments and channels. Maintained by farmers and fisher folk, these unique wetlands receive the city’s sewage, organically treat it with the help of sunshine, oxygen and microbial action and turn into a productive fish habitat.

Through this process (called bio-remediation), the waterways clean the city’s wastewater in less than 20 days. This purified nutrient-rich water is then channeled into ponds, called bheries in local parlance, where algae and fish thrive.
As the urban extends with population increase, developments have taken large portion of the wetlands to meet the population needs, but in turns is harming and shrinking the wetlands. A natural resource the people of Kolkata need.
Water to Land Connection

Figure 2.33
Land/Water Analysis

Material Expression

Expresses:
- Edges | Threshold | Boundary |

Affects:
- City grid and layout over time | Ever-changing edges between the land and water
  City is considered to be located in a basin with flood prone threat

Focus:
- Usage of material to create the edge
- Weathering of edges/material over time
- Accessibility to people | vehicular
- Vulnerability due to weather threat, flooding, overpopulation
- Water reflects the negative and positive usage/waste of people of kolkata based on its changes. Aspects such as pollution and climate change
- Lack of Maintenance
- Materiality and its importance to the city

Approach:
- How does the edges of water/land affects the social and spatial conditions of the city and people (as individual and as group).

Social Conditions
- How do people interact with it?

Spatial conditions
- Way people use the waterways
  (Transportation, drinking, potable, cleaning, waste basket, overfill it to increase the land for expansion of developments, religious & cultural & traditional connection)
- Reduction of wetlands

Hooghly River | Wetlands
- Hooghly River provided with connection to rest of the world, water for people to use, etc.
- Wetlands help people grow food and catch food and is considered drinking water.
Kolkata Drainage System

Circular Canal was one of the principal navigation arteries. Excavation of the canal was started in 1829 and was completed in 1833. The Circular Canal, originally conceived as a navigational channel has no gradient originating at Chitpur, it bifurcates near Gaznavi Bridge and terminates at E.M. By-pass. The eastern branch is known as New Cut Canal upto VIP Road Bridge. The channel has been serving as drainage channel. The Circular Canal is connected with the Hooghly river at Chitpur through an outfall sluice and a navigational lock and with Eastern Drainage Channel.

Water Logging has been the most important issue during heavy rainfall. Circular Canal receives significant runoffs as well as water logged rain due to inverted elevation issue in the canal. Thus, there is a higher chance of area near the canal to be flooded due to low city’s elevation above sea level.
Kolkata has a tropical climate. In winter, there is much less rainfall than in summer. The temperature here averages 26.2 °C. The average annual rainfall is 1735 mm. Lack of proper drainage leads to flooding throughout the city, destruction of structures, economical impact, pollution spread, and displacement of people within the city. The ecological structure of the city is impact enough to leave a lasting footprint of degradation.

The risk of flooding along the canal paths makes it critical to lift the edges of the canal in order to avoid high water levels. The residential area along the canal will need better slopped drainage towards the canal in order to let water out during rain or storm.
Kolkata | Flood History

1978
Major Flood | Lack of Flood Management

1986
Heavy Rains

1991
Flash Floods | 35,000 Houses Damage

1995
Floods caused erosion | Severe Agricultural Damage & outbreak of diseases

2006
Heavy Rains | left large part of Kolkata underwater

2013
Heavy Rainfall | Dam release led to flooding

Kolkata | Flood Vulnerability

Figure 2.39
Ecology | a branch of biology that deals with the relations of organisms to one another and to their physical surroundings.

Urban Ecology | Urban ecology is a recent field of study compared to ecology as a whole. The methods and studies of urban ecology are similar to and comprise a subset of ecology. The study of urban ecology carries increasing importance because more than 50% of the world’s population today lives in urban areas. Urban ecology is the study of ecological processes in urban environments. This includes all aspects of the ecology of any organisms found in urban areas as well as large scale considerations of the ecological sustainability of cities.

Like natural ecosystems, they bring in energy and materials and process them through their components as they flow through the system. Urban ecosystems include concentrations of people and the built environment as well as the productive ecosystems generating the energy and matter required to sustain the whole.

Only if the urban system is ecologically complete does it have a chance of becoming self-reliant and sustainable.

Urban Ecological Standards

The urban ecological standards can be divided into different frameworks to better breakdown the complex ecological factors.

Urban Conditions
Geographical conditions
Social conditions
Spatial conditions
Cultural environment
Access By Proximity
Green Building
Clean Environment
Proper use of Resources/Materials
Clean and Renewable Energy
Unique Cultural Values
Community Identity
Quality of Life
Economy/Education
Ecological Integrity | Biodiversity

![Urban Ecological Standards Diagram](https://www.ecocitystandards.org/framework/)
3.0 DESIGN PROCESS
3.1 SITE DEVELOPMENT

Urban Development

**Central Threshold**
Central waterways which becomes the spine for the both sides as it binds them together. It will serve as the prominent factor in the redeveloped planning.

**Water Restoration Re-Imagination**

**Transition Zone**
This zone is an important part of the planning for restoration as it will serve as buffer between the canal, the people, and the city. It will become a spatial and socially interactive space which would invite people into connect with each other.

**Conventional Zone**
The zone will be connected to the interactive transitional zone, while serving as a threshold for residential, commercial, and industrial based on current demographics.

**External Zone**
This zone will reconnect the restored zones to the existing and mitigate dramatic changes by merging them through spatial design means.

**Canal**
Canal stretches between 150 ft to 210 ft in width. It will work as inter-mediator between both sides. Active social life will be reintroduced and it will help spark relation between people and the built environment.
Circular Canal
Site Programmatic Conditions

EXISTING

1. Lock gate
   Rail-track Bridge
   Industrial Zone

2. Green Park
   Vehicular Access
   On Edge | Slums

3. Residential Zone | Retail
   On Edge | Slums | Road

4. Central Railway Station
   Pedestrian Active
   Open Market

5. Industrial Zone
   Separation of Canal
   Drainage External
   Vehicular Bridges

6. Residential Zone
   Green Forest Park
   Natural Ponds
   Procession into Wetlands

PLACE FOR DISPLACED
Displaced people from canal edge slums will be provided with affordable living and vernacular community in order to help them integrate back into the society.

PROPOSED

1. Water Filtration System
   + Jobs for poor
   + Lock gate Management
   + Ecological Preservation | Swells

2. Literature Market
   Recreation | Green Park
   Swales | Filtration Pond
   Step-well system into Canal
   Pedestrian Path | Bridge

3. Linear Parks | Green Spaces
   Swales | Filtration Pond
   Step-well system into Canal
   Pedestrian Path | Bridge

4. Open Market
   Pedestrian to Rail Paths
   Interactive Space

5. Recreation | Green Park
   Swales | Filtration Pond
   Step-well system into Canal
   Pedestrian Path | Bridge
   Residential Zone

6. Green Park | Preservation
   Water Preservation
   Water Filtration System
   Retention | Detention

Durga Puja Ceremonial
Poetry Slam | Concert
Cultural | Religious Spaces
Shadows of Slum Traces
Regular Program Spaces

Figure 3.2
Site Schematic Design | Programs

Site 1

Site surroundings, canal, and canal edges have high pedestrian activity. + High Pedestrian activity + Existing Nature Park + Cross Separation of Canal + Residential & Commercial Zone

Proposed land to water connection Easier connection to residential and commercial zone Park provides unique connections by allowing multi-purpose programs to be introduced. Pedestrian bridges will help connect across canals, three-way.

Figure 3.3
Site Schematic Design | Programs

Site 2

Site 2 surrounds, train station, and canal edges has high pedestrian activity.
+ High Pedestrian activity
+ Existing Central Train Station
+ Residential & Commercial Zone

Proposed land to water connection.
Connection to residential and commercial zone, thus open market.
Pedestrian bridges needs to be separate from Rail bridge.

Proposed Program

- Market & Religious Space
- Central Train Station
- Residential & Commercial
- Proposed Open Market
- Vegetable Market
- Literature Market
- Proposed Pedestrian Path | Bridge

Figure 3.4
Site Schematic Design | Programs

Site 3

Site surroundings, natural ponds, and canal edges is open and forestation covering the area.
+ Two Existing Natural Filtration Ponds
+ Existing Green space
+ Residential Zone and Edges

Proposed land to water connection to residential area and ponds, thus open pedestrian paths and market spaces.
Proposed Learning center Space to teach people about importance to preserve natural ecology or help restore it.

Figure 3.5
Step-well has been part of Indian culture and traditional for long time. There is an importance to designing a step-well into a form of water, it is part of religious purification process for people following Hinduism.

Kolkata is signified for its Durga puja, a traditional and religious ceremony lasting for days and has important impact on the people and the city. The waterways are an important element of the Kolkata living ecosystem. Thus the connection would strengthen the bond between people and water.
Step-well Procession | Proposed Design

- Linear Green Park
- Pedestrian Path
- Cultural Spaces
- Stepped procession into water to submerge
- Canal
- Canal Walkway
- Fish Market Activated
- Open Market
- Green Space
- Religious Spaces
- Linear Park
- Activated Canal

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Step-well Procession | Proposed Design

Activated Canal
Pedestrian Bridge
Pedestrian Path
Green Space
Linear Park
Cultural Spaces
Traces of Slums hut | Shadow of Slums presence
Open Market

Stepped procession into water to submerge
Swales will be introduced in the canal ecosystem to help filter through the polluted canal water and bring back the ecosystem. The design of the filtration ponds and swales will be in relation to the rice fields. Leveling the swales based on the sloped edges of the canal to better provide filtration of the water in or from the canal.
Green Space

Traditional Cultural Spaces

Pedestrian Paths Bridges

Stepped Filtration
Bio-Swales
Ecological Sanctuary

Open Market

Traces of Slums hut Shadow of Slums presence

Activated Canal
Linear Green Park

Stepped procession into water to submerge

Canal Walkway

Fish Market Activated

Pedestrian Paths

Swales | Filtration System

Traditional | Cultural Spaces

Pedestrian Bridges

Open Market
Kolkata is known for its fish food, so regeneration of the canal will activate the boat usage throughout, thus creating floating markets on the canal and land. It will also introduce literature Market, in which the people of Kolkata will get to indulge on all forms of literature such silent space, poetry slams, storytelling plays, theaters. Lastly the vegetable market will be integrated through the market places introduced to accommodate the basic need of the people.

The importance of fabric is interlocked with the traditional, cultural, and religious ideology and belief as they help bring forth unique fabrics and styles of the people of West Bengal. The usage of the fabrics will become the outlying factor of how the spaces will be used. Fabrics are an important part of city, it truly gives the city its name, the “City of Joy”.

Traditional and Vernacular materials of the local area will help the design connect to the people of Kolkata and their roots, because materiality comes from the root of its civilization.

Materials such as: Clay | Brick | Wood | Mud | Bamboo

Traditional & Vernacular designs use these materials to construct forms which provide natural aspects of the nature in the house, light, wind, and such.
Kolkata is known for its fish food, so regeneration of the canal will activate the boat usage throughout, thus creating floating markets on the canal and land. It will also introduce literature Market, in which the people of Kolkata will get to indulge on all forms of literature such as silent space, poetry slams, storytelling plays, theaters.

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### 3.3 PLACE FOR THE DISPLACED

**Designing Living Community**

**Proposed site for relocation of people that are currently living on the canal edges and slopes.**

The site is right across the Sealdah Railway Station and the Circular Canal as well. The site was left unused by the Railway Management service, so it is a perfect site to design and produce a housing community for the homeless and poor.

**Programmatic Approach**

Affordable Living
Urban Green Space
Integrative Vehicular Access
Pedestrian Paths
Water Filtration Pond

The intent of the urban housing development is to give a place to live for those thousands of people being displaced due to the Circular Canal’s regeneration project. The displaced people will be helped and given better place to live to give a standard to social classes and living.
Proposed Living Community

Figure 3.23
Living Community | Design 1

Figure 3.24
4.0 DESIGN SYNTHESIS
4.1 SITE DEVELOPMENT

Urban Development

Figure 4.1

1. Tram
2. Rail Track
3. Open Space

Figure 4.2

1. Stepwell Process
2. Slums Canal Edge
3. Religious | Cultural
4. Literature
5. Structure + Materiality
6. Market
7. Filtration System
8. Floating Market
Urban + Ecological Programs will vary throughout the canal edges and on the canal. Gradient in spatial convergence and flow.

Canal Programs | Plans

Green Space | Linear Park | Water Filtration System | Local Materiality
Swales | Filtration Pond | Recreation Spots | Vernacular Market
Culture | Traditional Space | Dance | Cultural Space
Mixed-Use Space | Literature Park | Poetry Slam/Concert | Framing the Slums
Religious Ceremonial | Fish Market | Durga Puja Ceremony

Preservation | Restoration
Built Form | Nature | Urban Spaces
Literature | Traditional Market
Stepwell Process
## Canal Programs | Perspective

<table>
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<th>Nature</th>
<th>Urban Spaces</th>
<th>Preservation</th>
<th>Restoration</th>
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</table>
Built Form  Nature  Urban Spaces  Preservation | Restoration

Nature Field  Swales

Slums' Structural Frame  Open Multi Purpose Space  Water Edge  Water Edge
4.2 DESIGN RESPONSE

Canal Stepwell | Site Plan
Canal Program | Detailed

- Literature Market
- Recreation | Green Park
- Step-well system into Canal
- Pedestrian Path
- Connection to City
- Activated Canal Travel
- Swimming
- Fishing
- Recreational Activity
- High Population Usage
- Cleansing of the City
- Religious Space
- Literature Market
- Recreation | Green Park
- Step-well system into Canal
- Pedestrian Path
- Connection to City
- Activated Canal Travel
- Swimming
- Fishing
- Recreational Activity
- High Population Usage
- Cleansing of the City
- Religious Space
- Literature Market
- Recreation | Green Park
- Step-well system into Canal
- Pedestrian Path
- Connection to City
- Activated Canal Travel
- Swimming
- Fishing
- Recreational Activity
- High Population Usage
- Cleansing of the City
- Religious Space

- Floating Market
- Event Space
- Pedestrian Paths
- Durga Puja Ceremonial
- Poetry Slam | Concert
- Cultural | Religious Spaces
- Shadows of Slum Traces
- Water Filtration System
- Filtration Pond
- Swales
- Ecological Preservation
- Green Park
4.3 ECOLOGICAL RESTORATION & PRESERVATION

Urban_Scape | Ecological Restoration & Preservation

PHASE 1. Reclamation | Clean Up
of the Kolkata city is to clean up the land which is reclaimed for the ecological preservation and Restoration. It also focuses of relocation of the homeless and the poor into another proposed urban living area.

PHASE 2. Programmatic Zoning
Applied based on the spatial urban layout and land use of the canal and its surroundings. There are 6 different zones applied to the stretch of the canal. They modify the program based on the need of the people.

PHASE 3. Integrated Spatial Construction
The process of construction will be in phases as the most integrated spaces will be constructed initially to spark interest into the urban-scape designed for the people.

PHASE 3A. Bridges | Swales | Steps
Pedestrian Bridges will be constructed to better connect the Old and the New Kolkata. Swales will be introduced in the canal ecosystem to help filter through the polluted canal water and bring back the ecosystem that used to be thriving there long ago. Steps will be introduced through the edges of the canal fragmented, based on the pedestrian traffic in the area. The steps will help people be more active with the flowing water of the canal and the nature.

PHASE 4. Connecting Spaces | Pedestrian Paths
The last phase and the important as it will connect the 5.5 mile stretch of the canal and across the canal using pedestrian activated paths and interactive spaces, such linear parks, plays capes, temples, cultural events, markets, cafe, restaurant, and several other programs.

---

Figure 4.5

Main sites to begin construction
Construction Progression into Phases
The Circular Canal is a center thread of the woven fabric of Kolkata, a thread which is a crucial urban scape that connects the Old Kolkata and the New Kolkata. The canal has created a disconnect, (1) Cultural, (2) Traditional, (3) Ecological, (4) Generation, and (5) Vernacular. The lack of proper use of the canal, lack of maintenance, polluted, waterlogged, and backed up sewer has made it inattentive for people and the local ecology as the once striving ecology has degraded due to such issues. The design response tackles such issues by designing an urban scape, which includes aspects such as integrates spaces with multi-use programmatic spaces. Such spaces would integrate religious and cultural spaces together.

The design springs from using the existing conditions to express the need of change for the betterment of the city and its ecology. The slums temporary framework will be kept to show the shadow of slums after it has been replaced by urban scape of stepwell procession. The stepwell procession has been acknowledged by Indian culture and architecture to connect land with any source of water. The Bio-Swales plays a key role in cleaning up the water as it travels through the canal and from the land. Using local plants, trees, and greenery, The urban space becomes natural to its land and the people and integrate easily in the canal.
Circular Canal & Kolkata’s Issues

Improper Use of Canal
Overcrowded by people and cars

A place for Homeless and Poverty stricken people to live

Garbage, dirt, and drainage has clogged up the Canal

Loss of Identity
Disconnect between Old and New

Ecological Degradation of an ecosystem of the canal

Response to Issues

Durga Puja Ceremonial
Poetry Slam | Concert
Cultural | Religious Spaces
Shadows of Slum Traces

Literature Market
Recreation | Green Park
Step-well system into Canal
Pedestrian Path
Connection to City

Activated Canal Travel
Swimming
Fishing
Recreational Activity

Floating Market
Cultural | Religious Space
Event Space
Pedestrian Paths

Water Filtration System
Filtration Pond
Swales
Ecological Preservation
Green Park

Figure 4.6
4.5 PHYSICAL MODELS

MODEL 01 | Market Place Stalls | Section: 1/4"=1’0”

MODEL 02 | Mixed Use Open Market Place | Section: 1/4"=1’0”
MODEL 03 | Bio-Swales + Linear Green Park + Ecological Edge | Section: 1/8"=1'0"
5.1 ILLUSTRATION CREDITS

SECTION 1.0

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Figure 4.5 - Map Illustration created by author using Google Image, snazzymaps, Photoshop, & Illustrator.

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