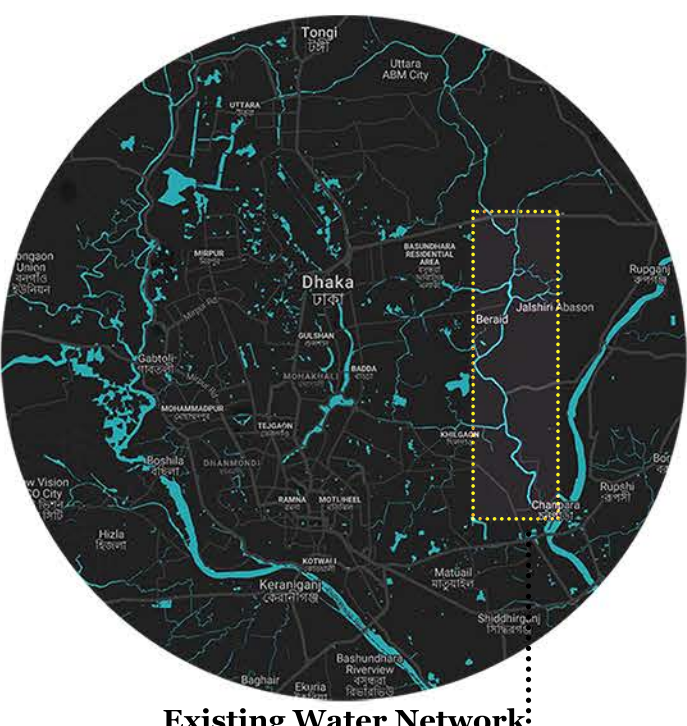
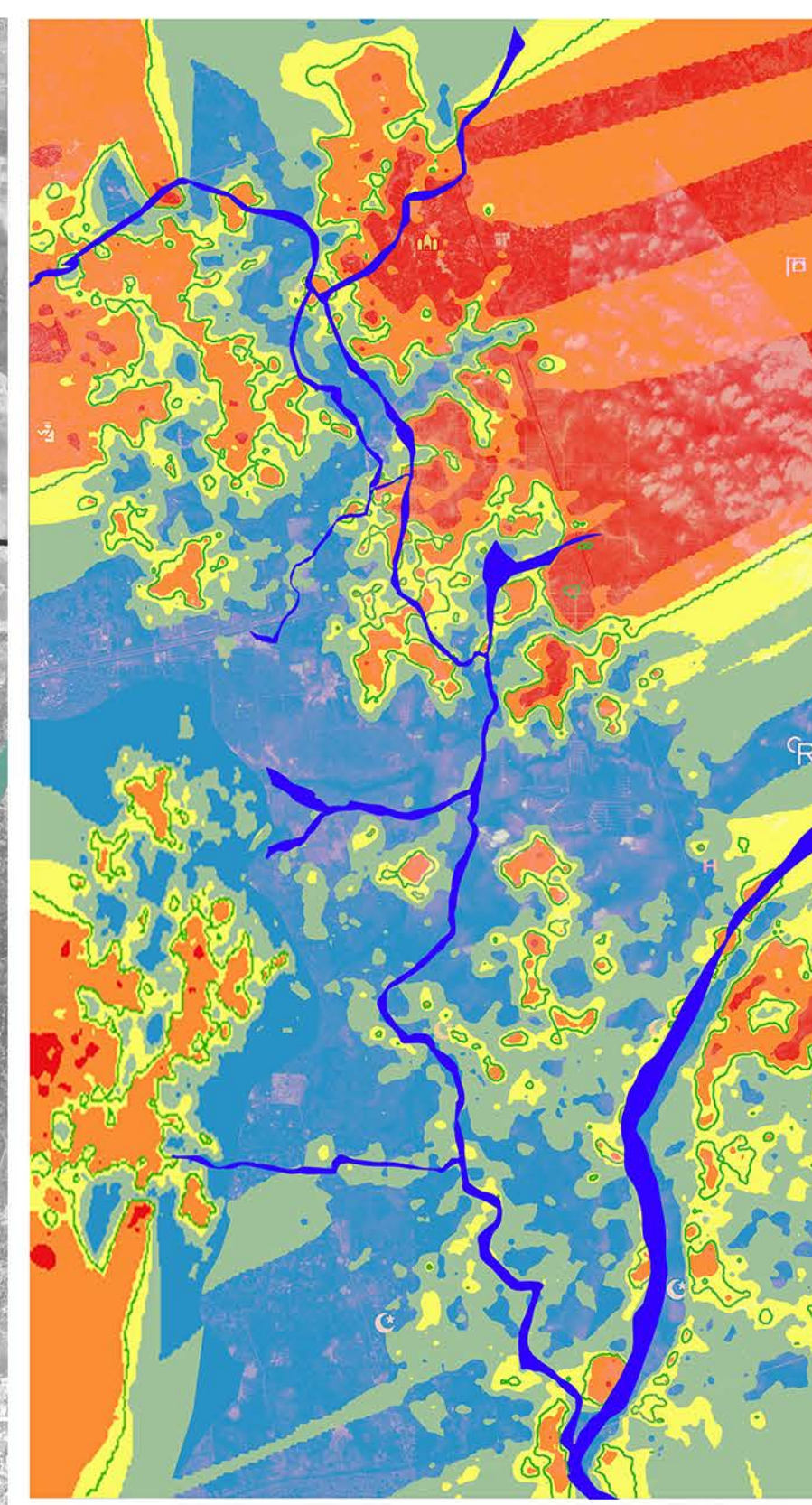
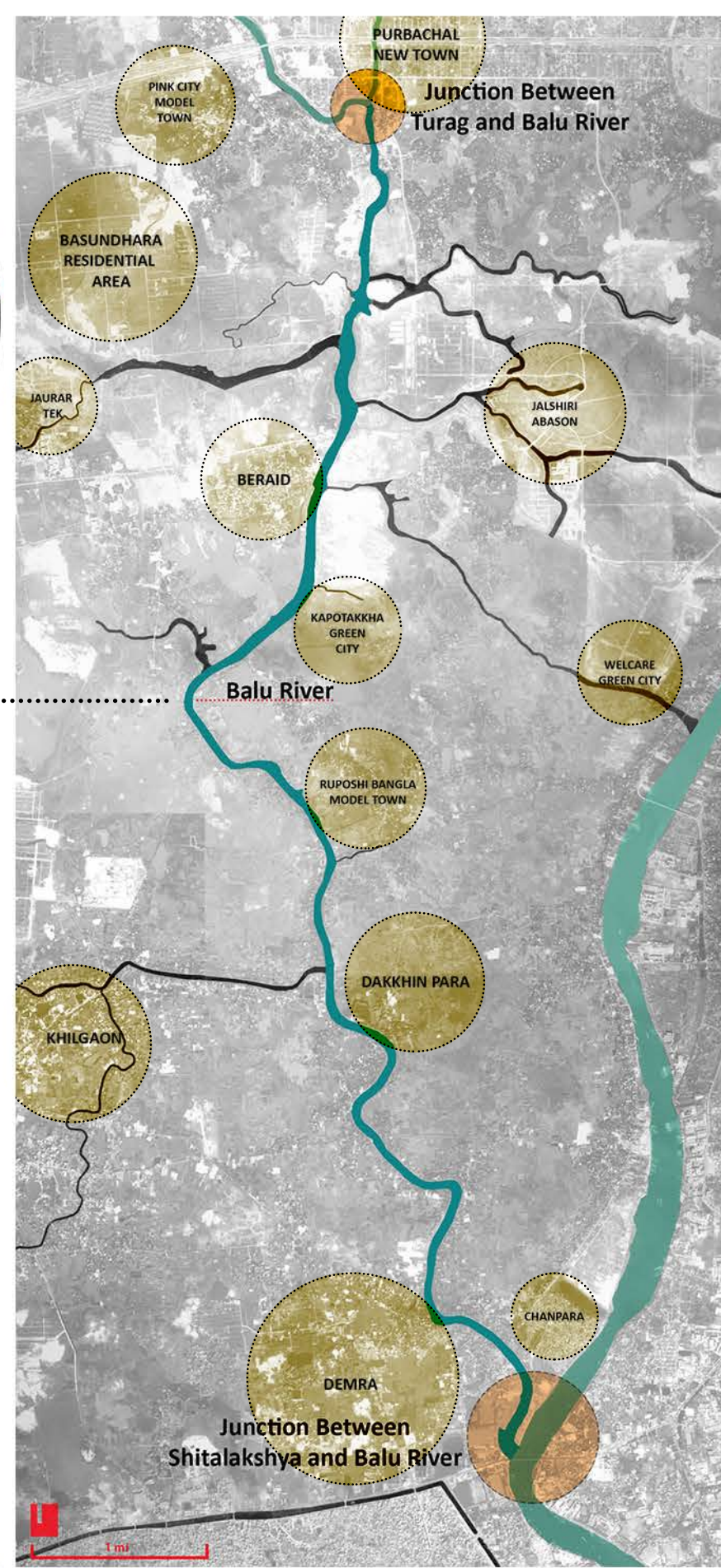


Bangladesh being a deltaic land, its capital Dhaka city is surrounded by six rivers (Balu and Sitalakhya on the eastern side, Turag and Buriganga on the western side, Tongi khal to the north and Dhaleshwari to the south) like a garland. Balu River is one of the most significant rivers of eastern Dhaka which carries excess water from Sitalakhya and Turag during seasonal floods, and also acts as a medium for local drainage. Due to massive discharge of urban waste waters, untreated effluents from textile industry, agro-chemicals, sewage, solid waste, as well as oil spillage, storm run-off and rapid encroachment, Balu is now in its deathbed in Rugganj and Beraid areas. At present, A 44 km long riverbank offers a challenging but wonderful opportunity of forming a new urban edge by resuscitating the dying river with proper landscape intervention and planning strategies.

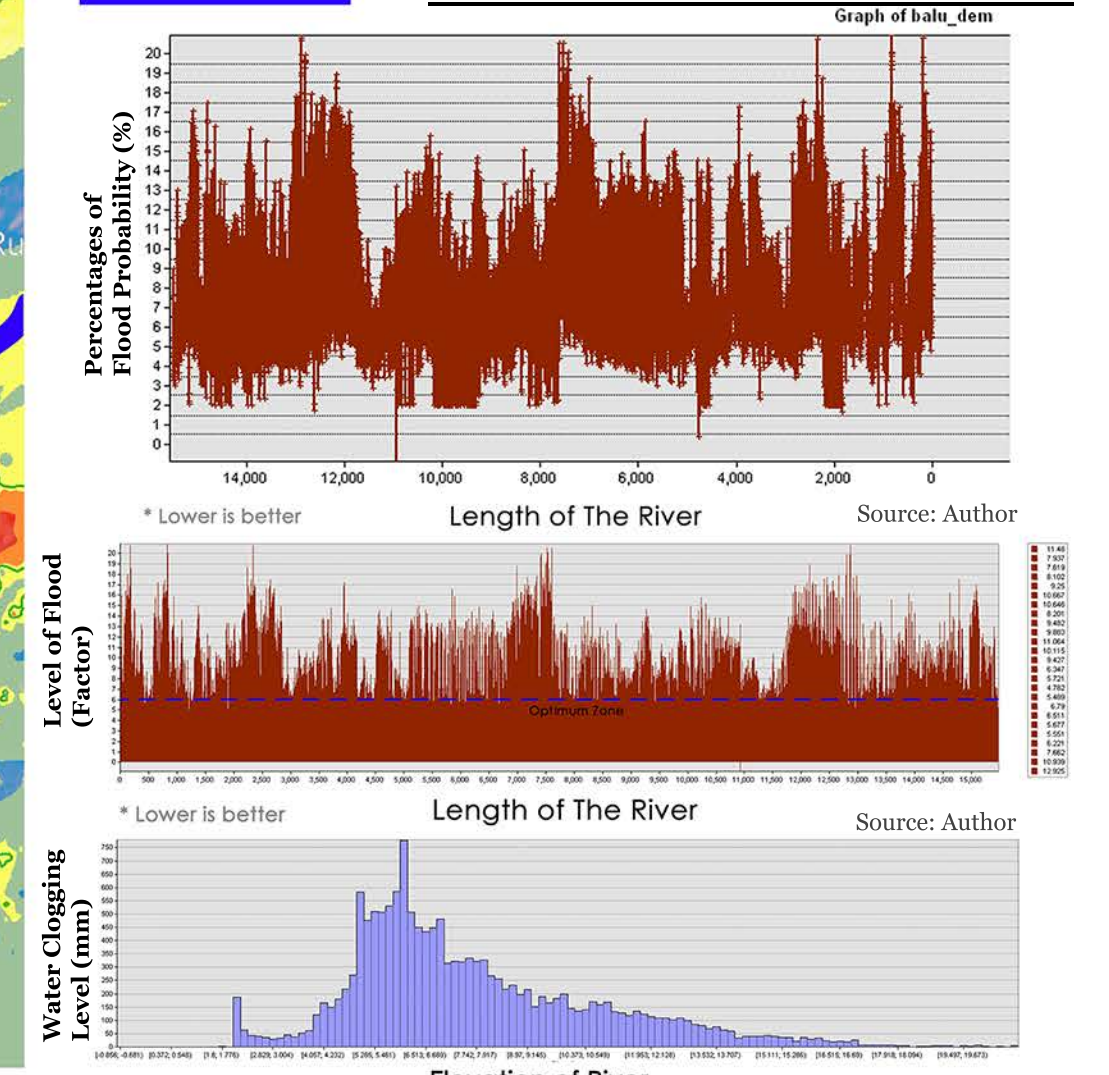


Existing Water Network Dhaka



Elevation	Date/Time
-0.856	22/12/20
0.437	22/03/21
1.688	22/05/21
1.688	22/07/21
1.762	22/09/21

The following results represent the existing water situation including flood probability, water clogging level, and inundation level using ArcMap_ArcGIS. It is evident from the simulation that at present the Balu river is unable to provide successful water transmission through it due to its narrow width and poor width and also water cloggings. Besides existing high inundation level is responsible for frequent flood around the river edge.



Existing Situation around Balu River :



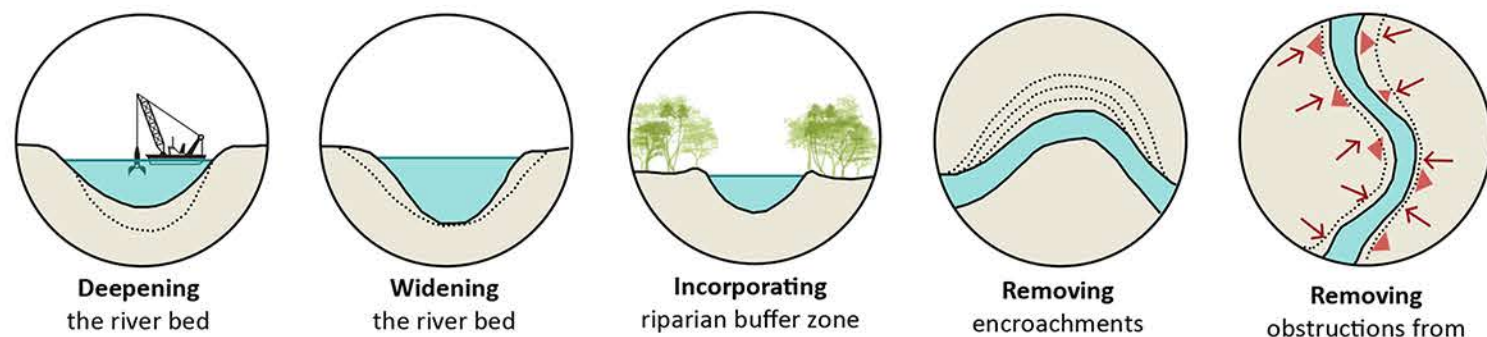
Images showing current encroachment and pollution situation of the Balu River



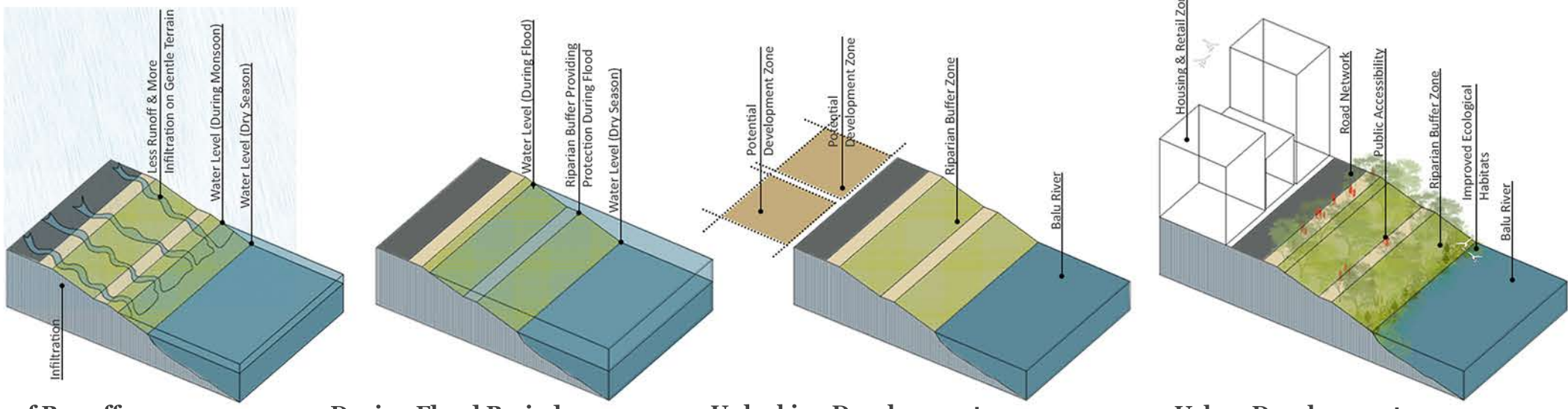
Images showing current river edge situation of the Balu River, Source: Author

River Eco-Restoration :

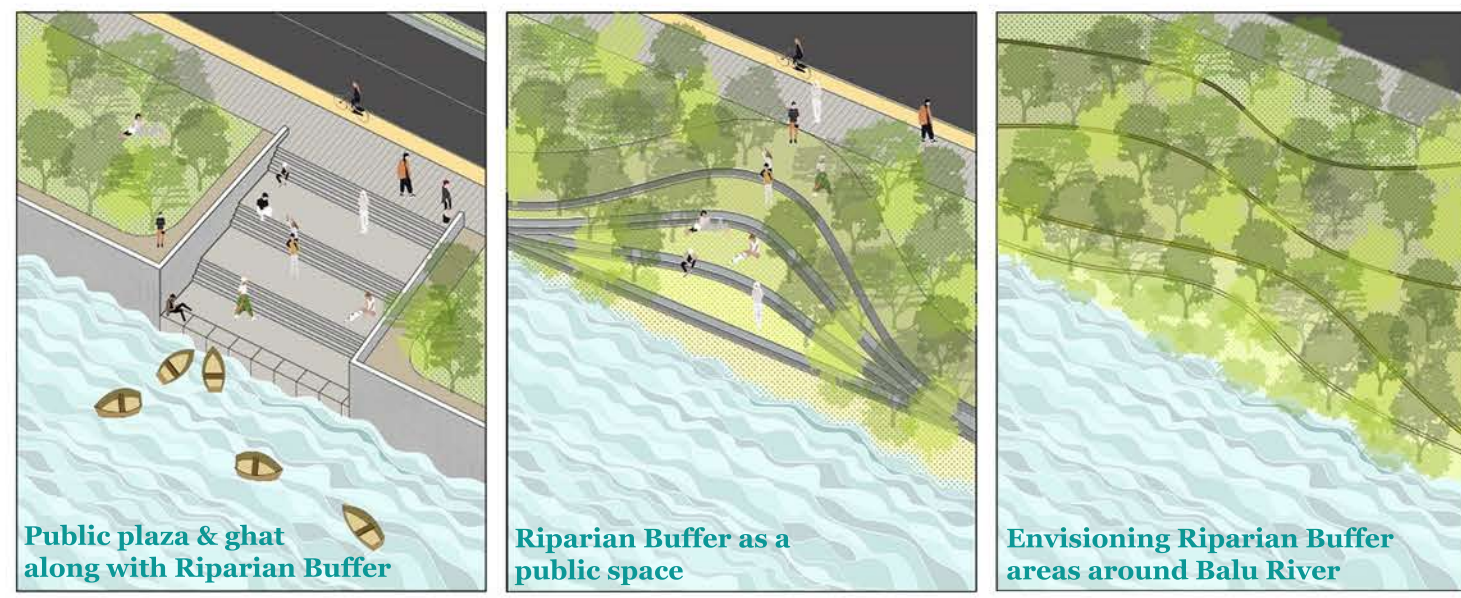
- In Bangladesh, due to rapid urbanization and urban sprawl, severe degradation of rivers as well as their catchment areas and floodplains has been observed.
- Such a situation requires healing the present polluted condition of urban rivers by restoring their ecological integrity. Some basic restoration methods are illustrated below to understand the holistic approach of this idea.



Healing Balu River: Revitalizing Riparian Zone (Proposal for Future Development)



Slow Down of Runoff & Water Level During Monsoon, During Flood Period (Submerged Riparian Zone), Unlocking Development Potential at Riverfront Plots of Balu, Urban Development along with Balu River Edge. Source: Author



It is evident that unplanned development of residential areas and burgeoning industrial areas without any wastewater treatment plant are highly responsible for the declining situation of the Balu River. At present, the river edge is facing massive encroachment by both Government and private housing projects. Besides residential development, the river water are being polluted due to untreated industrial wastewaters from adjacent factories (paint, building materials), power station and municipal solid wastes from Dhaka and Tongi. In order to revive the Balu River again, a proper planning strategy is required. Riparian buffer areas can introduce better urban opportunities to create public plaza, ghat and pocket parks and will also create a new urban realm. The riparian zone is an interface between land and waterbody that allocates 25-100m buffer from river edge for ecological, environmental, economic, cultural and transportation uses. Riparian buffer is important for its role in ecology as a bio-filter, in prevent-ing soil erosion and also its role as a shelterbelt during hazardous events.

As Riparian plantation can purify water pollution in a certain degree as plants have strong absorption capacity for pollutants and good tolerance against toxic effluents. Some aquatic plants of Bangladesh that may be helpful for rejuvenating the Balu River are being proposed below;

Floating Aquatic Plants :



Submerged Aquatic Plants :



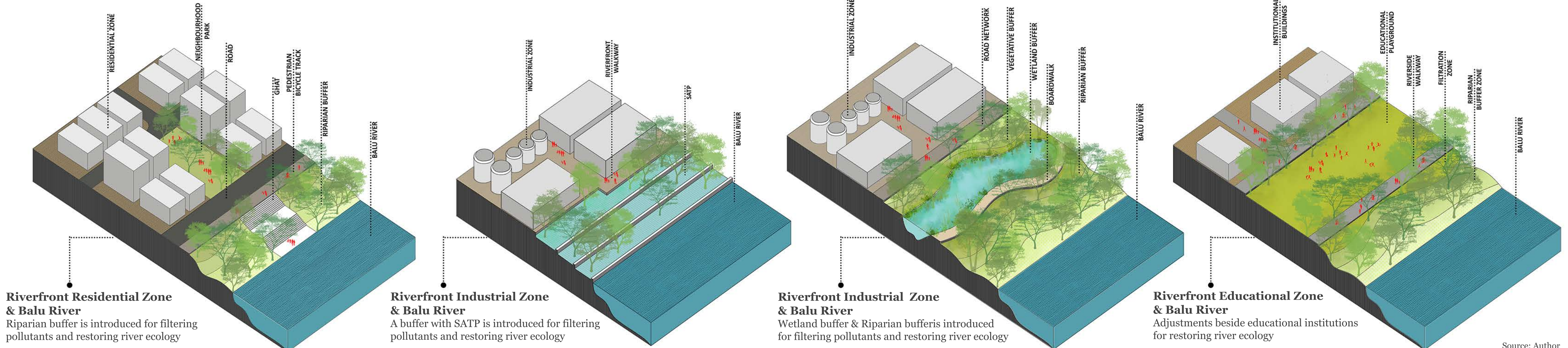
Emergent Aquatic Plants :



Policy to Mitigate the Situation

In Bangladesh, people at policy level seems to be indifferent to solve the deep-rooted problems associated with Balu Rivers. But it is high time to rethink the issue at policy level as most of the rivers are vanishing from our map. Following policies can be considered to mitigate current haphazard situation;

- All illegal encroachment should be removed and the river edges should be free from any kind of encroachment.
- A proper landscape intervention for buffer zone must be planned while preparing a masterplan for the development of the Eastern side of Dhaka.
- Land management laws must be introduced to recover the lands that have been invaded.
- In order to grow awareness among neighborhood, awareness campaigns must be conducted.
- Wastewater treatment plant must be an integral part of all industrial zone.
- The government has been drafting a master plan to protect the Buriganga, Balu and Shitalakhya that will also considers issues including the wastewater management and the sewerage system.



Riverfront Residential Zone & Balu River, Riverfront Industrial Zone & Balu River, Riverfront Industrial Zone & Balu River, Riverfront Educational Zone & Balu River. Source: Author

HEALING BALU RIVER, DHAKA: RESTORATION THROUGH REVITALIZING THE RIPARIAN BUFFER ZONE

DIMENSIONS OF SPACE - Multi-disciplinary Approaches (FARU 2020 International Research Conference)

The growth of Dhaka, the capital of Bangladesh, is characterized by rapid urbanization and frequent expansion, due to which its urban tissues are transforming in an environmentally detrimental manner. As a result, a 110 km long waterway network of four significant rivers of Dhaka, which was once an integrated part of the city fabric, continues to disappear. Flowing for 44km along its east side, Balu River is an important lifeline for Dhaka. Due to massive water pollution and rapid encroachment, Balu is now in its deathbed having no trace of flood basin areas thereby causing brutal ecological change to a precious landscape. This research explores the present declining condition of the river and its surrounding edge and seeks to illustrate how a polluted dying river can be revitalized. Among various methods, riparian ecosystem restoration is one that seeks to correct water quality, degraded ecosystems, and recreate lost habitats. A qualitative research method is used to address the research problems that involve the collection of the primary data through visual observations, photographs, field surveys, sketches, and field notes. Later computer-aided drawings based on map and field surveys have been prepared. The study is focused on finding a suitable landscape solution to restore the river edge and also a possible buffering system to protect from future encroachment, as well as their integration with present and future urban development. In overview, this study aims to come up with a model that will combine a new city pattern with the rejuvenation of a river system, thus opening the doors to a new urban experience.

SHAUNI PRIYAM SIKDER , MUHAMMAD GOLAM SAMI

Department of Architecture, Khulna University of Engineering & Technology, Khulna, Bangladesh
shauni.sikder@arch.kuet.ac.bd, shauni.29arch.buet@gmail.com