



ECO-RESTORATION OF WETLANDS

NAGAVARA LAKE Bengaluru, Karnataka

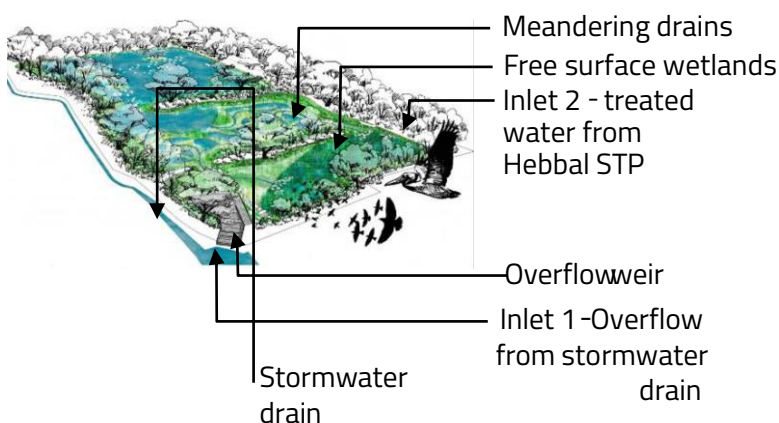
PROJECT BRIEF

Nagavara Lake, locally referred to as Lumbini Gardens, is a popular recreation spot located along the Outer Ring Road, next to Manyata Tech Park in Bengaluru. The lake is spread over 75.1 acres, of which 22 acres is the wetlands.

At present, the wetlands are covered with water hyacinth and solid waste, and construction debris is disposed at some points. Karnataka Lake Conservation and Development Authority (KLCDA) called for technical consultancies to improve the aesthetics and performance of the wetlands. CDD was chosen to prepare an eco-restoration plan for the wetlands and to provide a detailed project report on the same.

EXPECTED PROJECT OUTCOMES

- Design aesthetically and efficiently functioning wetlands
- Improve the biodiversity around the wetlands and choose suitable flora for the wetlands
- Ensure adequate water levels in the wetlands to sustain biodiversity during dry seasons
 - By allowing required stormwater inflow into the wetlands
 - By allowing treated water from Hebbal STP into the wetlands
- Review and upgrade the water infrastructure inside the wetlands.



SALIENT FEATURES

- **Source:** Treated wastewater from STP, Stormwater overflow from peripheral drain.
- **Influent Quality:** BOD - 30 mg/l & COD - 150 mg/l
- **Expected Effluent Quality:** BOD 30-20 mg/l

PROJECT SPECIFICATIONS

Project Owner: KLCDA
Design Consultant: CDD Society
Year of study: 2018

SYSTEM IN BRIEF

The interventions are planned to ensure efficient usage of wetland space in order to restore its functionality as stormwater and water treatment infrastructure. For this, arrangements for regulated inflow from an adjacent drain and Hebbal STP are proposed in addition to natural water treatment systems to improve the water quality.

The interventions can be broadly classified into the four components:

1. Flow regulation:

- Overflow weir with screens at the northwestern corner of the wetlands to regulate stormwater overflow - 12m wide with 8m width at sill level
- Sluice gate arrangement for regulating treated wastewater from Hebbal STP - 250mmx300mm for 1.5 MLD of flow & 50mmx; 85mm for 0.45 MLD

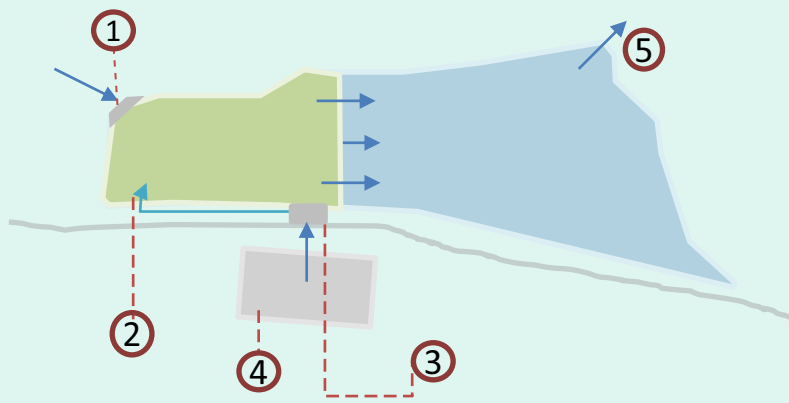
2. Wastewater treatment:

- Free surface wetlands, meandering drains, pond systems.
 - Free Flow Treatment area ~4,000 m², average depth: 150mm
 - Meandering drain of 190m x 2m x 0.13m
 - 12m x 1.55m with 100mm openings

3. Biodiversity:

Indigenous species of wetland flora such as Branching herb, papyrus, typha, colocasia etc.

4. Others : Partial de-weeding and desilting

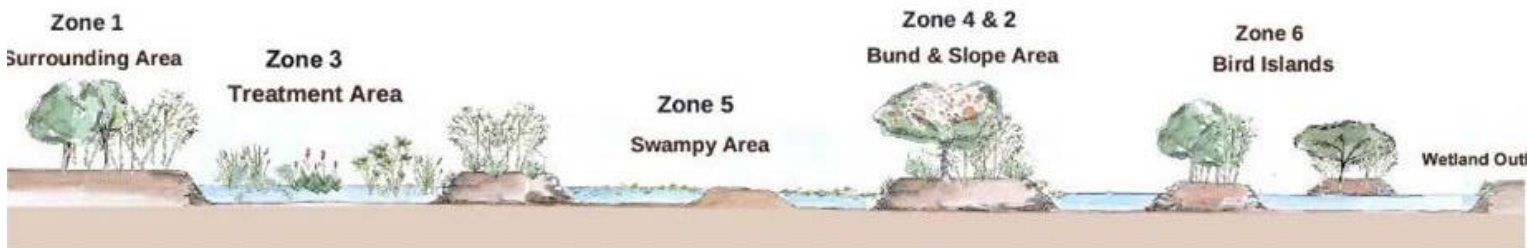


1. Overflow weir
2. Inlet for STP treated water
3. Diversion arrangement for STP treated water
4. Hebbal STP
5. Lake outlet

STRATEGIES FOLLOWED FOR REJUVENATION:

- Minimum **disturbance / interference** to the existing system
 - Build on existing assets
 - Limit disturbance to the existing ecology
- Design a **graded landscape** that shows temporal and seasonal variations contributing to the richness of ecology and enhancing biodiversity; bringing it closer to a living system
- **Embed / deploy native local species** that are aesthetic and efficient.
- **Use of treated STP effluent** to keep certain parts of the wetland alive throughout the year
- Use of **Free Water Surface (FWS) wetlands** to further polish the treated wastewater before discharging it into the large wetland area

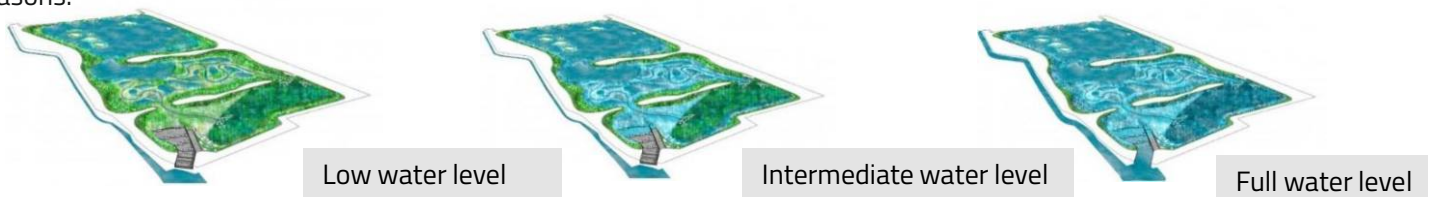
WETLAND ZONES:



SEASONAL VARIATIONS OF WATER LEVELS

One of the key outcomes of the restoration plan is to maintain sufficient water levels even in dry seasons to sustain biodiversity. Interventions are planned in order to supply optimum amount of water to the wetlands in different seasons.

The graded landscape allows the wetland to sustain under varying water levels while maintaining its aesthetics.



Key features of free surface wetland

- Open water surface with water exposed to atmosphere
- Shallow water depth area
- Macrophytes - Submerged, surface and emergent

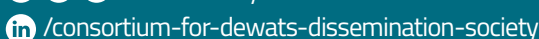


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