Government of Odisha
Housing & Urban Development Department
3rd Floor, Kharavel Bhawan, Unit-V, Bhubaneswar-751001

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No. HUD-PROJ-SCH-0018-2023/ 6767 / HUD, Bhubaneswar, the 24.03.2023

From

Ms. Sagarika Patnaik
Special Secretary to Government & State Mission Director (AMRUT)

To

The Commissioner, all Municipal Corporations/
The Executive Officer, all Municipalities/
The Executive Officer, all NACs

Sub: Ama Phokhari – Rejuvenation of Urban Water Bodies: Standard Operating Procedure

Sir,

There are more than 2000 water bodies in the state requiring immediate attention and inorder to rejuvenate these water bodies in natural way, a Standard Operating Procedure has been developed which is **enclosed** herewith for further necessary action at your end,

Yours faithfully,

Encl: Standard Operating Procedure

S. Patnaik 24.3.23
Special Secretary to Government &
State Mission Director (AMRUT)

Memo No. 6768 /HUD/dt. 24.03.2023

Copy with enclosure forwarded to Advisor, Water Rejuvenation Unit, Unnati Bhawan, Bhubaneswar, Email: **wruodisha@gmail.com** **for information and necessary action.**

S. Patnaik 24.3.23
Special Secretary to Government &
State Mission Director (AMRUT)

Ama Pokhari

REJUVENATION OF URBAN WATER BODIES

Standard Operating Procedure

Housing and Urban Development Department

Government of Odisha

Table of Contents

Abbreviations

AMRUT	Atal Mission for Rejuvenation and Urban Transformation
BOD	Biochemical Oxygen Demand
CDPO	Child Development Project Officer
CMM	City Mission Manager
COD	Chemical Oxygen Demand
CSR	Corporate Social Responsibility
CSS	Centrally Sponsored Schemes
DMF	District Mineral Foundation
DO	Dissolved Oxygen
DGPS	Differential Global Positioning System
DPR	Detailed Project Report
EHS	Environment, Health & Safety
EO	Executive Officer
EOI	Expression of Interest
H&UD	Housing & Urban Development
IA	Implementation Agency
ICDS	Integrated Child Development Services
IE	Implementation Expert
IEC	Information Education and Communication
IP	Implementing Partner
MSG	Mission Shakti Groups
MUKTA	Mukhya Mantri Karma Tatpara Abhiyan
NGO	Non-Governmental Organization
OMBADC	Odisha Mineral Bearing Area Development Corporation
O&M	Operation & Maintenance
PHEO	Public Health Engineering Organization
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
PPP	Public Private Partnership
RA	Running Account
RLs	Reduced Levels
RoR	Record of Rights
RRR	Repair, Renovation & Restoration
RWA	Resident Welfare Association
SDA	Slum Dwellers Association
SMM	State Mission Manager
SMDO	State Mission Director Office
SOP	Standard Operating Procedures
SUDA	State Urban Development Authority
TDS	Total Dissolved Oxygen
TMU	TULIP Management Unit
ULB	Urban Local Body
WATCO	Water Corporation of Odisha
WPR	Weekly Progress Report
WRU	Water Body Rejuvenation Unit

Definitions

a) **Wetland**: A wetland is an area of land that is either covered by water or saturated with water. The water is often groundwater, seeping up from an aquifer or spring. A wetland's water can also come from a nearby river or lake. Seawater can also create wetlands, especially in coastal areas that experience strong tides. The word 'Wetland' is sometimes used interchangeably with Water Body.

b) **Catchment Area**: Catchment area is defined as a land through which water from any form of precipitation (such as rain, melting snow or ice) drains into a body of water (such as a river, lake or reservoir, or even into underground water supplies – 'groundwater').

c) **Ecosystem:** An ecosystem is defined as a system includes all the living things (plants, animals, and organisms) in a given area, interacting with each other, and also with their non-living environments (weather, earth, sun, soil, climate, atmosphere).

d) **Aquifer:** An aquifer is a body of saturated rock through which water can easily move. Aquifers can be both permeable and porous and include such rock types as sandstone, conglomerate, fractured limestone and unconsolidated sand and gravel.

e) **Bathymetric Survey:** Bathymetric survey is a survey which allow us to measure the depth of a water body as well as map the underwater features of a Water Body with dual frequency echo sounding technology.

f) **Silt:** Silt is fine sand, clay, or organic matter decomposed and carried by running water and deposited as a sediment.

g) **Sludge:** Sludge is a semi-solid slurry that can be produced from surface run-offs, water treatment plant, wastewater treatment plant or on-site sanitation systems.

h) **Lagoon:** A Lagoon is a shallow body of water separated from a larger or main body of water by means of barriers or by a narrow landform. They are mainly constructed to trap the silt and other material entering the main water body.

1. Background

1.1 Introduction

Water bodies/Wetlands are topographical depression where water is stored. It is a distinct ecosystem that is flooded by water, either permanently (for years or decades) or seasonally (for weeks or months). In India, tanks/ponds and lakes have traditionally played an important role in conserving water for meeting various needs (i.e., drinking water, domestic uses, irrigation, tourism, cultural & religious, industrial, etc.) of the communities. In the Urban context, wetlands directly and indirectly support millions of people in providing services such as storm and flood control, clean water supply, food, fiber and raw materials, scenic beauty, educational and recreational benefits.

Now the water bodies are under threat due to rapid urbanization. The major reasons for depletion of waterbodies are due to shifting from community-based tank system to individual beneficiary dependent system, prolonged and continuous neglect of maintenance, encroachments in the tank bund, foreshore, water-spread and supply channels, entry of wastewater into waterbodies, Choking up feeder channels.

The need of the hour is to rejuvenate the water bodies and give new life for direct and indirect benefits. Urban Water Bodies and Wetlands (including marshlands and swamps) are a critical aspect of Odisha's extensive hydrological network. Water Bodies/ Wetlands are essential for human well-being, economic security and climate change mitigation and adaptation. The multiple benefits provided by wetlands are essential in achieving Sustainable Development Goals. Forming an integral part of the hydrological cycle, properly managed wetlands/water bodies in urban areas have an important role as a source of water supply, controlling run-off and recharging groundwater.

The Hon'ble Chief Minister of Odisha's vision of making urban Odisha water secure and ecologically diverse has identified the need to rejuvenate waterbodies in urban areas. Hence, the Urban Waterbody Rejuvenation Program has been initiated by the Department of Housing & Urban Development, Government of Odisha. More than 2000 waterbodies have been identified in all urban areas of the state to be mapped and rejuvenated in a planned and sustainable way.

A new scheme has been launched to rejuvenate Urban Water Bodies in a natural and sustainable manner, with the help of Mission Shakti Groups (MSGs). This scheme has been named as **"Ama Pokhari".**

Objectives:

The key objectives of the programme are-

- Mapping of urban water bodies with proper documentation.
- City specific water body rejuvenation action plan.
- Multi stakeholder (ULBs, WRU & MSGs) capacity building to equip them with required knowledge and skill.
- Large scale public awareness campaign about values & functions and ecosystem services they provide through IEC activities by adopting multiple media.

1.2 Overview of Waterbodies Rejuvenation in Odisha

The fast pace of urbanization has been placing tremendous pressure on urban areas to provide a good quality of life for majority of humankind. The Housing & Urban Development Department, Government of Odisha seeks to undertake ecological restoration of urban water bodies throughout Odisha.

H&UD Department, Government of Odisha has formed a Water Body Rejuvenation Unit in January,2022 dedicated for revival of urban waterbodies and aquifer management under the initiative of “Ama Pokhari” programme. Advisors have been appointed as expert members for this advisory unit to support in this journey.

Why Ama Pokhari

Ama Pokhari lays a new approach towards Water Body Rejuvenation that revolves around enhancing the quality of water, sustaining the rejuvenation with the help of community.

The Key principles are as follows

- Rejuvenation with minimal to nil use of concrete.
- Focus on water quality improvement and soil-water interface (ancient methods).
- Campaigning under the "Mukhya Mantri Karma Tatpara Abhiyan” (MUKTA) as part of the Urban Livelihood Mission. Implementation will be driven by Mission Shakti Partners.
- Supervision of Water Bodies Rejuvenation works during execution phase by Interns.
- Captivating In-House Drawings/Estimates/DPRs.
- Focus on generating more workman hours instead of machine hours.
- Focus on nature-based solutions (Ecologically) making the rejuvenation process relatively economical.

1.3 Implementation Framework

- ULBs will identify and nominate a "Water Champion", a Nodal Officer at ULB Level.
- Nodal Officer will identify Water Bodies across ULB and Categorise using Health Score Card.
- Pre-Requisite study including Survey, Investigation, Water Testing, etc. will be conducted and Drawings/Estimate/DPR will be prepared by concern ULB officers with support of Nodal Officers who in turn will coordinate with WRU for suggestions and inputs.
- ULB Heads will review and put up the DPRs’ to Water Body Rejuvenation Unit(WRU) and ILW offices of their district for further approvals. After review by WRU, list of DPRs will be submitted to the office of State Mission Director (SMDO). DPRs approved from SMDO will be given to the Nodal Officers, which in turn will take further necessary action for onboarding MSGs and issue Work Order with the defined timelines.
- Nodal Officers will identify the requirement of Interns for their ULB and coordinate with WRU for onboarding. WRU will review the requirement and direct TMU accordingly.
- Simultaneously ULBs will onboard MSGs in consultation with CMM, SMM & SUDA following the due process elaborated in Chapter 5.
- After onboarding of MSGS & Interns, orientation programme will be conducted by ULB representatives to sensitize on the Water Body Rejuvenation.
- Field work will commence with foundation stone laying in presence of representatives from ULBs, MSGs, WRU including Interns.
- During field work, WRU representatives may visit periodically to review the progress.
- During implementation, Interns at ULB level will provide the Daily Progress Report/Weekly Progress Report along with progress photographs to all stakeholders including ULBs, WRU, SMDO, etc.
- After completion of Water Body Rejuvenation, a meeting will be organised by ULBs with community/RWA. A representative will be assigned from RWA to take-up the Operation & Maintenance of Water Bodies Rejuvenated.

- During Operation & Maintenance, feedback and complaints will flag through the given Complaint number and MO Sarkar which will be supervised by WRU.

2. Water Bodies Rejuvenation Process

2.1 Pre-Requisite Study

- Select the Water Body to be rejuvenated using the preliminary Data sheet attached as **Annexure-1**.
- Categorise the Water Body based on self-evaluation Health scorecard developed by Water Body Rejuvenation Unit to determine the level of degradation. Based on Ocular observation the score card to be filled against each sub-indicator. Each indicator shall be assessed for maximum score of 100%. The higher percentage indicates higher degradation. Based on score a Water Body can be categorized into three categories as mentioned below:
- Healthy (Overall score 0-7.99)
- Degraded (Overall score 8-14.99)
- Severely Degraded (overall score 15 and above)
  The Health Score Card Template is attached as **Annexure-2**.
- Demarcate the boundaries of Water Body and locate the areas encroached by nearby neighborhoods if any, based on Record of Rights (RoR). Initiate process for removing encroachments at site, following due official formalities.
- Trace the Inlet/Outlet points of waterbody including sewerage. It is required for mapping all the inlet/outlet positions.
- Measure the water inflow & outflow velocity of water body which is required to prepare the temporary check dams or diversion channels.

2.2 Survey & Investigation

Survey

Conduct Drone survey supported with DGPS along with Bathymetric Survey. DGPS (Differential Global Positioning System) survey results in fast, accurate and compatible with software such as AutoCAD, with capability of easy conversion to drawing.

During survey the following checklist to be addressed-

- Mapping of all the existing inlets & outlets to be done.
- Capture features of all adjacent roads, culverts and other infrastructure surrounding Water Body.
- Record RLs of Catchment Area, Embankments and Inlets.
- Conduct Bathymetric survey (with dual frequency echo sounding technology) to ascertain depth of Water Body and Mapping of underwater features.
- Prepare Scaled drawing in AutoCAD covering all the survey details.

Investigation

Ascertain the characteristics of soil (Cohesiveness (C.), Angle of Repose (Ø) in the Water Body. Geotechnical Investigation to be organized and Undisturbed Soil samples to be collected to identify the nature of soil at various depths.

Water Testing

Collect Wastewater samples and organize the tests to assess the Effluents/influents present in the water and its sources. The details of parameters to be tested are mentioned below.

- BOD_5 at 20^o Celsius (mg/L)
- COD (mg/L)
- D.O (mg/L)
- TDS (mg/L)
- Turbidity (NTU)
- Heavy Metals (Chromium, Copper, Cyanide, Lead,etc) to understand the presence of Industrial waste.

2.3 Preparation of Maps & Drawings (Input for Architects)

The following are the Cardinal principles to be considered for preparing Maps & Drawings

- Increase the Detention period of water by increasing the length of travel. This will help in Aeration to take place and settle the waste at the bottom.
- There should be no barrier between Soil and Water. Soil and Water interaction to be allowed for natural treatment.
- The export, import of sludge and soil should be carefully adjudged with respect to the bandwidth i.e., project area and buffer area.
- Focus on Ecological Rejuvenation with minimal to nil use of concrete/masonry.
- Inner embankments shall be provided with two-fold gradients (with one landing having 150mm water depth). Preferrable slope shall be (1V:2H) or more.

2.4 Preparation of Estimate & Detailed Project Report (Input for Estimator)

Estimate:

An estimate is a calculation of quantities of various items of work, and the expenses likely to be incurred thereon.

Focus Points:

- To arrive at approximate cost of the project.
- Requirement of equipment and other materials shall be assessed like cement, steel, aggregate, sand, horticulture plants, dewatering pumps etc.
- Based on detailed estimation of different activities of the project, the resources are allocated and monitored.
- Finally, duration and timelines of the project are carried out.

Procedure of Implementation:

- Sub-divide the project into different items of work or activities.
- The quantity for each item is to be calculated separately from the drawings as accurately as possible.
- Cost of each item is arrived at taking rates from Analysis of Rates/ Schedule of Rates (Department of Works, Odisha, and PHEO, Odisha).
- In case of non-availability of items in above mentioned SoR like different type of plants, Delhi Schedule of Rates (DSR) by CPWD to be referred.
- In case of Non-SoR items, a detailed analysis to be worked out considering the productivity norms & basic rates of material, labour & machinery mentioned in SoR. Such rates derived should be verified and approved by the competent authority during the approval of DPRs. Also, in case where no basic data is available in SoR, then atleast three vendors shall be offered to quote their respective rates/price who are already registered under any of the works executing departments

under Government of Odisha, followed by thorough negotiation and approval by competent authorities.

- Provisional cost for Operation & Maintenance to be kept @2% per annum of the Estimated Cost.
- The format for preparation of estimate is given in Table 2.4.

Table 2.4

Sl. No	Description	Dimensions					Total Quantity	Unit	Rate in INR	Amount In INR
		No.	Length	Width	Depth	Area				

Do's & Don't' s

Do's	Don't s
▪ Estimate to be on concept of Zero Disposal of Silt / Slushy Soil. Excavated silt/slushy soil, to be utilised in strengthening of embankments, either existing or proposed. ▪ Borrowed earth within the project area may be used for fine dressing of slopes in embankments. ▪ Variations of quantity as per estimate vis-a-vis execution, are to be approved as per Codal provision, as like Deviation. Each deviation is to be recorded in the site order book and approval of such deviation to be taken from the competent authority. ▪ Separate provision to be considered in estimate for construction of temporary infrastructure at site like Toilets, Storage Godown, Barricading site boundaries to avoid Tress-passes, etc. ▪ Budget for mandatory safety PPEs like Shoes, Helmet, Reflecting Jackets, Gloves to be considered extra. ▪ GST as applicable to be added in the estimate. ▪ The Service charge for Implementing Partners @ 7.5% of the estimated cost to be added. ▪ Focus should be given to increase the Man-Hours based on feasibility. ▪ Work by Mechanical means may be considered wherever required. ▪ Separate compartments can be provided in a Water Body for Religious/Cultural activities like idol immersions during festivals. ▪ Dedicated compartments can be constructed to provide access to livestock for drinking water.	▪ No cost provision should be considered for permanent Land Acquisition or RoU or RoW. ▪ No cost for peripheral development works like Parks, Fountains, Food-courts, etc. should be considered in estimate.

Detailed Project Report (DPR):

DPR to be prepared in Broad & General manner including the following-

- Introduction of Water Body.
- Salient Features of Water Body.
- Methodology to be taken-up for Rejuvenation.
- Layout & Detail Drawings.
- Detailed Estimate (supported with analysis of rates).

3. Construction Methodology

Water Bodies are basically classified into two types as illustrated below-

Lake Model	Drain Model
1) Lake is a depressed land at lowest contour. 2) It may or may not have point source. 3) Flow of water is deliberate.	1) Drain is not necessary to be at lowest contour. 2) It has point source i.e., inlet & outlet. 3) Flow of water is high and may carry pollutants in high volume.

3.1 Methodology

The Methodology to be adapted as elaborated below are same in both the cases. However, the modality and sequencing of activities vary which is explained in subsequent chapters below.

a) Dewatering

- The surface water or seepage water has to be drained from excavated area.
- Diesel/Electrical Pumps can be used for this purpose.
- During excavation the bottom of the Water Body must be kept dry.
- Water level can also be reduced by cutting the embankment wherever possible.

b) De-Weeding

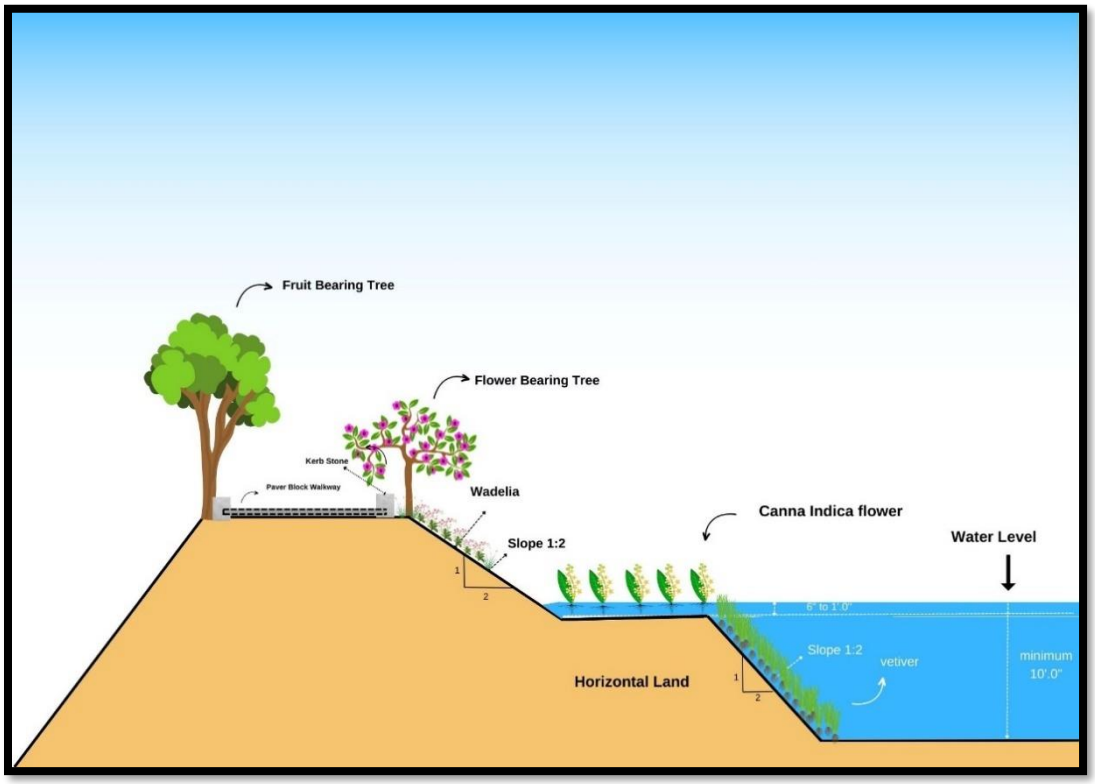
- Remove all wild vegetation like water hyacinth, Ferns, Macrophytes from waterbodies.
- Divert the incoming wastewater through bypass drain.
- First De-weed manually, along the existing sides of embankment/bund as far as possible.
- Uproot the vegetation from the root level so that growth of weed is reduced.

c) De-Silting

- To understand the depth of water and silt at different levels, Bathymetric Survey can be done.
- Divide the entire pond/tank/wet land into number of grids, which will help in removal of sludge and soil one after the other.
- De-silting can be done by mechanical means if required.
- The silt taken out from the Water Body shall be used to prepare the bunds for diversion channel.

d) Bund Strengthening

- Construct the earthen bund in such a way that there will be stability of slope against sliding or collapse of the bund. In case Water Body area is less than 10 acres, the slope should be prepared at 1:2 at least for 1 to 1.5 vertical depth of bund.
- To make the bund further stable, a horizontal landing of 3m shall be provided.
- Finally, embankment should be made in 1:2 slope till bottom of the Water Body.
- Don't make any stone pitching or concrete retaining wall for slopes.
- Plant Vetiver or Wedelia to make the slope more stable.
- If area of the Water Body is more than 10 acres, adopt flatter slope like 1:3 or 1:4 may be adapted.

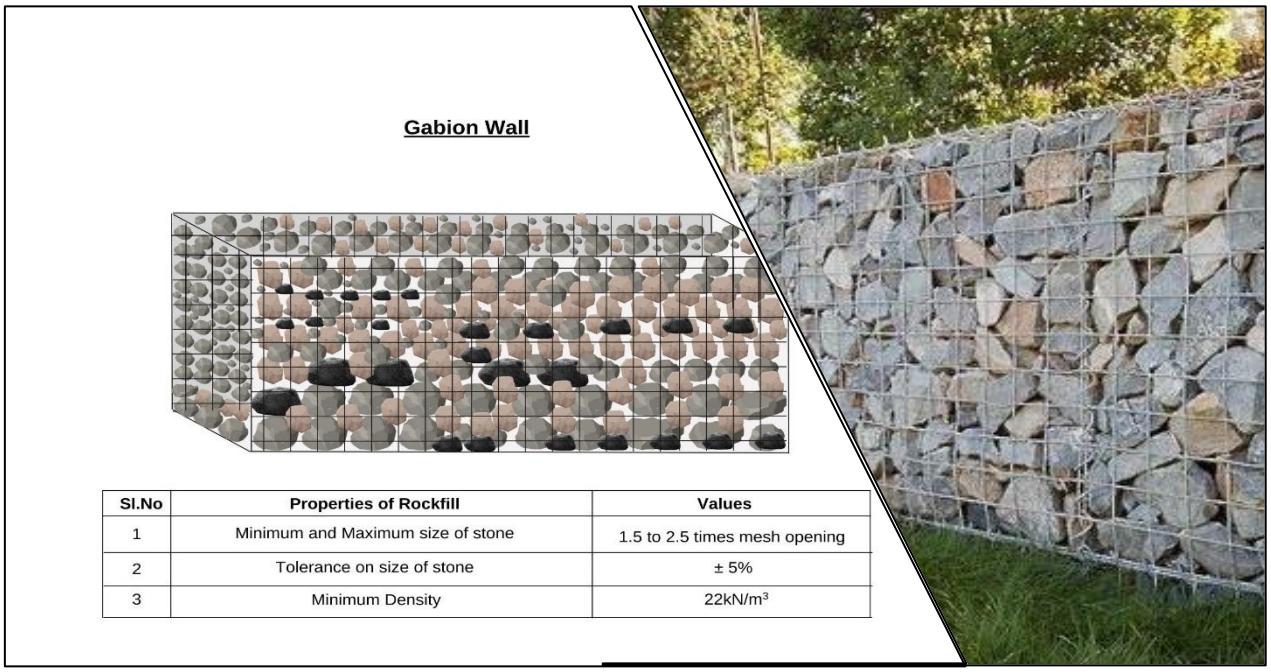


e) Silt Traps/Lagoon

- Construct a silt trap or Lagoon (basically a wetland having 3/4th depth of main Water Body) on the upstream of Water Body/Drain to arrest all the silt present in the wastewater.
- Detain the wastewater for a period of 1-2 hours so that all the silt and suspended particles will be settled.
- Provide Grated outlet to arrest all floating materials like plastic bottle & polythene etc. which should be cleaned regularly.

f) Gabion Walls

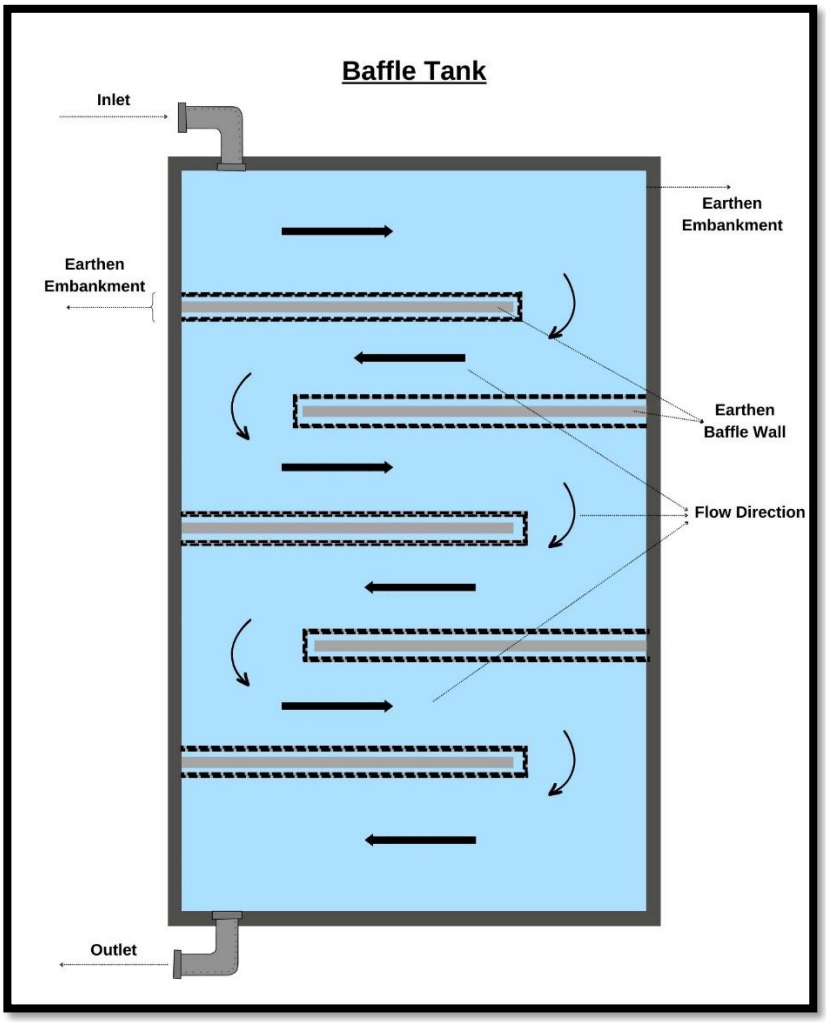
- A Gabion structure is prepared from pre-assembled rectangular cage made of double twisted wire mesh/polymeric (using polymeric materials such as Polymeric ropes and Geogrids) filled with boulders.
- Polymeric generally used for the Gabion structures constructed under the water.
- It is a simple gravity retaining structure.
- It is porous and water passes through it slowly.
- The size of stone shall be 1.5 to 2.5 times of mesh opening. Generally, 150mm to 250mm size rock is used for construction.
- The base width of Gabion to be maintained 0.6 to 0.75 H for Gabion up to 6 m height.



Sl.No	Properties of Rockfill	Values
1	Minimum and Maximum size of stone	1.5 to 2.5 times mesh opening
2	Tolerance on size of stone	± 5%
3	Minimum Density	22kN/m^3

g) Natural Treatment

- If Wastewater entering into Water Bodies, same should be completely segregated and discharged in a separate channel.
- Detain sewage/wastewater for 2-3 hours by constructing Baffle Tanks or similar type of structures which will help in reducing the BOD by 30% to 35%.
- Further, BOD reduces as the wastewater passes through Gabion Walls.
- Plant Canna Indica, Elephant Ears, Water Allegators, etc. on the slopes/horizontals of embankment to extract nutrients from wastewater.
- Provide Floating Wetlands on the channel & Water Body.



h) Pathway / Walking Track

- Construct Pathway around the water body with paver blocks as per specification.
- The width of pathway/walking track should be minimum 2m.
- Provide 0.50 m wide space on both sides of walking track for Plantation.
- Plant fruit bearing trees on exterior side and small flower bearing tress on the interior side of walkway.
- Provide sitting benches at 100 m interval.

i) Inlet & Outlet Reconditioning

Defined inlet & outlet arrangement system to be provided for every Water Body.

Case-1

- If only surface runoff enters the Water Body, it should be detained for few hours to allow the suspended solids to settle down and for decomposition of biodegradable nutrients.

Case-2

- If wastewater (Grey water) enters Water Body, it must be completely segregated and discharged in a separate channel to the downstream treating it naturally and ecologically. The channel may be provided with Baffle Wall or Gabion Wall system to increase detention period and plants like Canna Indica & Elephant Ears to be planted to extract nutrients (N,P,K) from water.

j) Biomining

- Manual Biomining to be conducted for segregation of waste which are essentially non-Biodegradable (Plastic, Cotton & Glass pieces).
- In case huge heaps are piled up, required machinery may be deployed for cleaning the site.
- For proper segregation, dig out at least 2 feet deep, both in Flat & slope profile.
- Use plastic trays with Pickaxe for better output.
- Glass as well as Plastic materials have salvage values. Hence, it needs to be segregated from the waste.

k) Diversion Channel

- Sewage eutrophicates waterbodies.
- Construct diversion channel with local earth to divert the flow of sewage.
- Construct Gabion Walls at every 50 m to 75 m intervals.
- Plant Canna Indica, Elephant Ear, etc. on the slopes and horizontals of the channel.
- Also plant Wedelia & Vetiver on the slopes.

3.2 Construction Methodology-Drain Model

- Excavate an open channel drain for Diversion of wastewater from upstream to downstream on one side of the drain keeping earthen barrier on the middle.
- Construct drain embankment /bund on other side of the drain using silt and soil excavated from Water Body.
- Construct the drain embankment on the other side as per above guidelines.
- The slope of embankment to be maintained as mentioned in 3.1.d.
- Construct Gabion Walls at every 50-75 m distance along the length of the channel.
- Plant Wedelia and Vetiver on the slopes of embankment.
- Plant Canna Indica & Elephant Ear on the horizontals.
- Construct Walkway as per procedure given above.
- Plant fruit-bearing & flower-bearing tress.

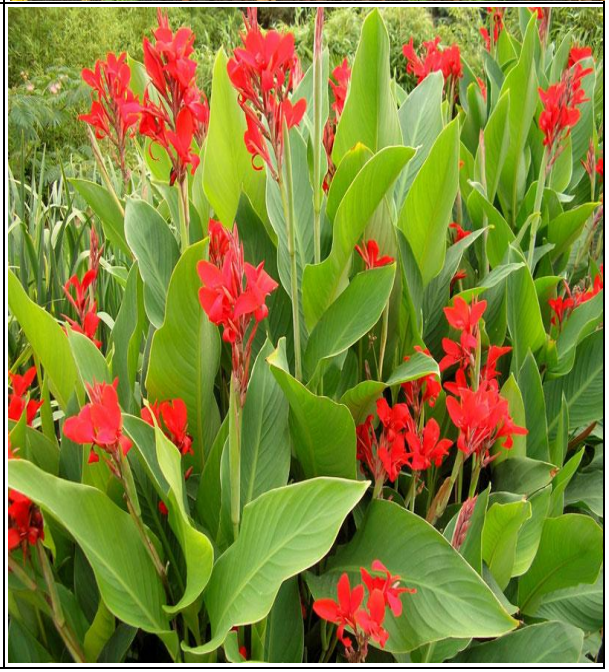
- Plant Bamboo tree with 1 m spacing with Bougainville creepers as fencing on the exterior side to prevent spreading of foul smell in air and also prevent throwing of solid waste into the Water Body.

3.3 Construction Methodology-Lake Model

- Construct a channel at one side of the pond to divert wastewater from inlet to outlet.
- Strengthen its embankment using excavated silt and soil from the Water Body.
- Construct Gabion Walls at every 50 m to 75 m intervals.
- Plant Wedelia and Vetiver on the slopes of embankment.
- Plant Canna Indica & Elephant Ear on the horizontals.
- Construct Walkway as per procedure given above.
- Plant fruit-bearing & flower-bearing tress.
- Plant Bamboo tree with 1 m spacing with Bougainville creepers as fencing on the exterior side to prevent spreading of foul smell in air and also prevent throwing of solid waste into the Water Body.
- Similarly, construct diversion channels on other side if required.
- Excavate earth from the main lake body upto designed depth.
- Water will be filled up in the main Water Body through seepage from bottom, water from diversion drain during rainy season.
- In dry season if required water maybe allowed into the pond from the last segment of the diversion channel by providing a gated pipe.
- Provide floating wetlands in channel and Water Body.
- Construct island in the middle of the Water Body if the area is more than 10 acres.
- Create forest in the island for nesting of birds.

4. Plantation

Details of commonly used Plants in Water Bodies are given below-

Type of Plant & Advantages	Soil Condition	Growth Size	Required Maintenance	Photographs
Plants for Embankment				
Wedelia: a) It can tolerate a wide range of pH levels and will perform well in virtually any soil. b) I It will grow and thrive almost anywhere if the weather is warm enough. c) In other words, Wedelia plant care is extremely low maintenance. d) Provide very good coverage.	Suitable Soil Types: Acidic, Adaptable, Alkaline, Clay, Loamy, Neutral, Sandy, slightly alkaline, Well drained in moist condition.	Plant grows to height of 6 to 9 inches and spread 4 to 6 feet.	Grows in moist soil condition. Watering to be done once in a week to keep the soil in moist condition.	
Canna Indica: a) It can purify the water buy absorbing nutrients & toxic gases in water. b) It is effective for the removal of high organic load, colour and chlorinated organic compounds from wastewater.	Slightly acid humus soil that is rich in organic matter, wet, loose, fertile and well-drained soil.	Grows to a height of 0.5 and 2.5 meters with spread upto 0.4m, the leaves are broad, elliptical shape, which can grow 30 to 60 cm long and 10 to 25 cm wide.	a) It requires a warm, humid, sunny and well-ventilated environment. Require 6-8 hours sunlight in summer. b) Watering is required once a week in areas where rainfall does not exceed 2.5 cm per week. c) Its suitable growth temperature is 16 - 30 ℃, and the ambient temperature should not be lower than 10 ℃.	

Vetiver: a) Controls soil erosion and sediment on sloping lands. b) Rehabilitation of saline and acid sulphate soils. c) Vetiver grass has been reported to be very effective in trapping both fine and coarse sediments in runoff water. d) Water purification. e) Controls algal growth. d) Able to grow in any kinds of soil, regardless of poorly fertile soil.	Can grow in acid-sulfate soil, acid soil, sandy soil, shallow soil, lateritic soil, gravel-mixed soil, deserted mine soil or salt-affected soil.	A dense, clumping perennial grass, to 1.5 m in height, native in India	Requires special care until the tillers can set themselves, the process needs no charge but delicate care taking by watering and adding manure to maintain the soil.	
Elephant Ears: It plays a crucial part in filtering the pollutants & off-gases from water.	Grows well in loose, fertile and well-drained soil.	Grows upto 9 feet tall & spread upto 4 feet, leaves are arrow shaped and can Grow upto 6 feet long & 2 feet wide.	Plenty of water is required, which dry out fast, every day. If they're droopy, they need to be watered.	
Bio-fencing				
Bamboo: a) It is economical and cost effective. b) Conserves Biodiversity and absorbs climate inducing gases like Carbon Dioxide.	Grows well in well drained sandy loam to clay loam soils with pH range of 4.5 to 6.0.	Grows upto height of 4-4.5m. Can be effective if planted at a spacing of 1m in the continuous trench.	a) Requires moderate sunlight for 3-4 hrs per day. b) Watering to be done for newly planted Bamboos for atleast 12 months.	
Bougainvillea: It is hardy, evergreen, fast-growing, colorful and thorny, makes a good fence.	Bougainvillea should be planted where no waterlogging takes place.	They can grow upto height of 30 feet. They grow best when given enough space to spread out.	Sunlight is the most important factor that helps this plant grow to its fullest. They need at least six to eight hours of sunlight a day.	

List of suggested plants for different locations related to wetlands is enclosed as **Annexure-3.**

5. Implementing Partners (IP) & Agency (IA)

5.1 Mission Shakti Groups

Water Bodies Rejuvenation initiative is taken-up through MSGs under MUKTA scheme to support the livelihood of urban poor. The detail process for onboarding of Mission Shakti Groups (in convergence with MUKTA scheme) as implementing partner for Water Bodies Rejuvenation is elaborated below.

Step-by-step process for engaging Mission Shakti Partners under MUKTA

Part – I Preparatory Activities

- Formation of a team consisting of officials from ULB and belonging to the concern Water Rejuvenation area.
- Finalization of Criteria for selection of MSG and Publication of Expression of Interest (EoI) by respective ULBs.
- Putting up notice in all Ward Offices and CDP Office for intimation to MSGs to apply for participation in Water Body Rejuvenation Initiative.

Part – II Follow up with MSGs for Application

- Visit to Field by CMM of respective ULBs to sensitize the MSGs on how to apply and prepare documents for selection.
- Follow up to ensure timely receipt of adequate applications from MSGs.

Part – III Formation of Selection Committee and Scrutiny of Applications

- Formation of a selection cum scrutiny team consisting of Commissioner/Addl. Commissioner/Executive Officer, City Engineer/Municipal Engineer, Deputy Commissioner/Zonal Deputy Commissioner, CO, ZCO, CMMs, Designated Ward Officer, representatives of Mission Shakti Department (CDPO/Representative of CDPO), etc.
- Scrutiny of applications and preparation of final list of MSGs by Selection Committee across wards.
- Preparation of minutes on the selection process of MSGs for approval by Commissioner/Additional Commissioner/Executive Officer of ULB.
- As an alternative means, additional MSGs may be selected and kept in waiting list that secured the next highest score in assessment.
- In the event of delay in the work against agreed timelines, waitlisted or empaneled MSGs can be onboarded for timely completion of work.

Part – IV Capacity Building – Orientation to MSG members & Issue of Work Order

- Orientation to members of selected MSGs by technical personnel of ULB on how to go about implementing the Water Body Rejuvenation initiative.
- Issue of Work Order to each MSG as per guidelines prescribed under SOP for Water Bodies Rejuvenation and/or MUKTA guidelines.
- Preparation of action plan report, translate to Odia and distribute to MSGs.

Part – V Field Orientation to the team and MSG members

- State Level Community participation team with the support of ULB Engineers, CMM, DUDA Experts to sensitize the field team on how to implement a Water Body Rejuvenation Initiative.
- Commencement of execution at the field level.

Eligibility Criteria for Selection of Mission Shakti Groups

S.No	Parameter	Criteria
1	Group Formation	Date of Formation of group shall be minimum 3 years prior to the date of submission of application.
2	Group Management	Strictly adhering to Pancha Sutra (Regular Meetings, Regular Savings, Regular Internal lending, Regular Repayment, Regular Record Keeping)
3	Involvement in IGA	Must have involved in Income Generating Activities (minimum criteria last 3 years)
4	Annual Financial Turnover	Turnover of atleast 2 lakhs in one financial year within past three years.
5	Financial Behaviour	No financial irregularities (such as loan declared as NPA, Write off, etc.)
6	Group Integrity	No record of involvement in any anti-social or criminal activities
7	Location	Preference to be given to MSG from the same ward. In case of non-availability of eligible MSGs within the Ward area, application may be invited from other wards.

Do's & Don't' s

Do's	Don'ts
▪ Involve MSGs and neighborhood community in the project. ▪ Select MSGs based on defined criteria. ▪ Define clear roles and responsibilities of stakeholders with measurable outcomes and timeline. ▪ Plan the work with a timeline and complete it within the given timeline. ▪ Monitor progress regularly and resolve issues and challenges ▪ Release the payment on time to Wage Seekers & IA (Implementing Agency)/IP(Implementing Partners) through DBT only ▪ Ensure quality and transparency across the implementation process ▪ Explore possibilities of convergence to maximize the outreach and impact ▪ Ensure common minimum facilities such as drinking water, first aid and childcare if nursing mothers are engaged ▪ While engaging wage seekers make it inclusive and equitable ▪ Select adequate number of IP required to complete work on time.	▪ Avoid use of machines as much as possible ▪ Do not engage contractors ▪ Do not pay cash to wage seekers and suppliers of construction materials ▪ Do not discriminate in wages for women, men, and transgender wage seekers ▪ Do not delay the process of payment to the MSGs and wage earners ▪ Do not issue work order without attaching detail action plan and estimate ▪ Do not process bills without physical measurement of work by the IE/JE/AE. ▪ Don't issue the entire scope of work in a single Work Order.

List of Documents to be furnished by MSGs during scrutiny

- Resolution of meeting conducted in past financial year along with copy of First Resolution of the group and the latest resolution.
- Updated Bank Passbook
- Cash Book - to know the detail of financial transactions
- List of Income Generation Activities
- Involvement in Govt. Programmes, i.e. MUKTA, SeTP, Aahaar, etc.
- PAN Card

Assessment Index

Sl. No.	Assessment Parameter	Marks	Means of Verification	Score/Remarks
1	Adherence to standard practices of Group Pancha Sutra (Reference period last 36 months) a) Regular Monthly Meetings b) Regular Savings c) Regular internal lending d) Regular Repayment e) Regular Record Keeping	20	1) Meeting/Resolution register 2) Cash Book & Bank Passbook 3) Cash Book 4) Cash Book & Bank Passbook 5) Meeting/Resolution register & Cash Book.	80% or more=4, 79-70%=3, 69-60%=2, 59-50%=1 Below 50%=0 List of registers- 1. Regular Monthly Meetings- 4 2. Regular Savings- 4 3. Regular internal lending- 4 4. Regular Repayment- 4 5. Regular Record Keeping- 4
2	No. of active members	10	Meeting Register & Bank Passbook of Mission Shakti Groups	10 Active Members = 10 7 to 9 Active Members = 8 4 to 6 Active Members = 6 < 4 = 0
3	Involvement in Income Generation Activity (IGA)	20	Observation (Interaction with MSG) & document verification like Cash Book & Bank Passbook.	3 Activity = 20 2 Activity = 15 1 Activity = 10 No Activity= 0
4	Turnover of Group	25	Cash Book & Bank Passbook of MSGs	1.7 Lakhs or more=25 2. 5.00 Lakhs to 6.99 Lakhs= 20 3. 3.00 Lakhs to 4.99 Lakhs= 15 4. Below 3 lakhs=0 (fraction scoring is not allowed)
5	Investment Capacity	25	Cash Book & Bank Passbook of MSGs	3.00 Lakhs or more= 25 2.00 Lakhs to 2.99 Lakhs=15 1.00 Lakhs to 1.99 Lakhs= 10 Below 1 Lakh=0
	TOTAL	**100**	**Note Fraction scoring is not allowed in any of the parameters.**	

Rating Assessment

- The MSG which secures the maximum mark will be selected for implementing the Water Body Rejuvenation works. If more than one MSG secure the highest mark, then selection will be done through lottery.
- If more than one MSGs are required, then their selection would be as per their ranking based on the marks secured.
- The selection committee shall consist of following members
    a) Commissioner/Addl. Commissioner/Executive Officer or any other authorised officer
    b) City Engineer/Municipal Engineer, Deputy Commissioner/Zonal Deputy Commissioner, CO, ZCO, CMMs, etc.
    c) Designated Ward Officer.
    d) Representatives of Mission Shakti Department (CDPO/Representative of CDPO).
- In case of non-availability of eligible MSGs within the Ward area, application may be invited from other wards. Selection will be done as per the approved assessment and selection process.

Important Terms and Conditions(To be part of Work Order):

- Work shall be commenced within 7 days from the date of issue of Work Order.
- Entire scope of allocated work shall be completed within agreed timelines from date of award of work order which the total timeframe allotted towards completion of work.
- On satisfactory completion of work within the agreed timelines, the group may be allocated further work based on the discretion of the Authority.
- Work execution shall be monitored to ensure weekly achievement of deliverable and overall completion of the project within the agreed timeline.
- If there is delay in mobilization of required resources and it is observed that progress is not as per work plan/ timeline, Authority reserves the right to Terminate/Cancel the contract and/or engage other Mission Shakti Groups at the risk of the MSG originally entrusted with the work.
- If progress of work is consistently found to be lagging against the stipulated timeline, in such cases also, in the interest of timely completion of the project, Authority reserves the right to descope any part of the scope of work, or, the entire balance work and assign to other Mission Shakti Groups at the risk of the MSG originally entrusted with the work.
- In the event and due to failure to execute as per timeline of work order as stated above the concerned MSG shall be kept under wait list in ULB for next 6 Months, during which no work shall be allocated to the same MSG by the ULB under any scheme. The MSG may be considered for issue of fresh work order, if the MSG convinces the Authority of their ability to execute the works without default and upon the satisfaction of the authority.
- Sample copy of Draft Work Order is enclosed as **Annexure-4** with all the important Terms & Conditions.

Orientation Programme for MSGs (Implementing Partners)

One day Orientation programme to be hoisted by ULB experts/officers for implementing agencies before commencement of work. Programme involves basic understanding on values and functions of the Water Bodies and inculcating new ideas, techniques, skills and utilization of tools for assessing their health and steps for rejuvenation and management.

Scope of orientation is as below

- Objectives of the Water Body Rejuvenation Programme.

- Roles & Responsibilities of different stakeholders.
- Social Mobilization Session (Addressing issues of the area & the need for leadership).
- Renovation & Development of Water Body through Community Participation.
- General Principles on Restoration of Water Bodies and preparation of Action Plan.
- Improving the Quality of work through Regular monitoring & follow up.
- Understanding of Budget, Timeline & Accessing financial provision by Implementing Partners.

Roles & Responsibilities

- Place requisitions for project requirements like Materials, Machinery & Tools in advance as and when required.
- Identification of Wage-seekers.
- Coordinate with ULBs and other stakeholders for timely completion of the project.
- Identify Environment, Health & Safety (EHS) hazards on the site and take corrective action.
- Sequencing and Execution of work, required for completion of the project.
- Submission of required documents like Aadhar Card, Bank passbook, etc. for Direct Beneficiary Transfer (DBT) and processing of bills.
- Updation & Timely submission of Muster Rolls.

5.2 Urban Local Bodies (ULB)

Roles & Responsibilities

- In Depth study of project requirements, understand end user expectations & requirement.
- Provide the complete Engineering services for the project i.e. Organising Survey, Preparing Maps & Drawings, Designing, Soil Characterisation, Water Characterisation, etc.
- Nominate a 'Waterbody Champion', a nodal officer from ULB and entrust with the responsibility to collate all the data at ULB level.
- Preparation of Estimate/Detailed Project Reports.
- Onboarding of implementing partners after due background verification.
- Orientation of MSGs by ULB on Water Body Rejuvenation.
- Planning of various resources such as manpower/machinery/material.
- Deployment of dedicated site engineers for supervision of site activities.
- Organising inspections and testing during procurement and execution stages.
- Preparation of monthly detailed planning based on the initial planning with breakup of main activities and resource requirements for that.
- Mobilisation of resources.
- Maintenance of site records pertaining to various site activities.
- Responsible for controlling and implementing the Quality system at site.
- Responsible for following all Environment, Health & Safety (EHS) standards.
- Timely certification of RA bills and arranging funds on time for smooth execution of work.
- Coordination with various stakeholders like PHEO/WATCO, OWSSB, District Collector, DUDA, etc.
- Overall administration of the Project.

6. Advisory Bodies

6.1 Key Stakeholders

1. Housing & Urban Development Department (H&UD)
2. Water Body Rejuvenation Unit (WRU)
3. State Urban Development Authority (SUDA)

6.2 Roles and Responsibilities

i. Housing & Urban Development Department (H&UD)

- Implementation of urban governance reforms (Eg AMRUT 2.0, 15th Finance Commission, etc).
- Formulation & implementation of enabling policies/guidelines.
- Digitization of schemes.
- Placement of Interns.
- Mobilization of fund from various sources for successful implementation of flagship projects.
- Ensuring effective monitoring, reporting & review of projects, confirming to the project timeline.

ii. Water Body Rejuvenation Unit (WRU)

Providing the necessary assistance to ULBs for smooth progress of the work as mentioned below.

- Planning of Water Body Rejuvenation Program with roadmap.
- Execute program related functions like preparation of guidelines.
- Provide guidance to ULBs in preparing DPR/Estimate.
- Review and arrange approval of DPRs from competent authority.
- Review the Method Statements/ Inspection Test Plans with respect to specifications/IS codes.
- Monitoring and reporting of status of achievement against monthly plan/ overall plan for the project.
- Periodically review the work progress and suggest for catch-up plan in consultation with all stakeholders.

iii. State Urban Development Authority (SUDA)

- Issue the operational guidelines to Mission Shakti partners for smooth progress of work.
- Provide the legal and social framework for smooth operation of projects.
- Regular follow up with MSGs to ensure increased ownership of the programme.
- Facilitation for timely generation & Processing of Muster Roll.
- Follow up with ULBs for timely release of Wages to labourers & Supervision Cost to MSGs.

7. Community (Neighborhood Association/RWA)

7.1 Roles & Responsibilities

- Participate in awareness campaign.
- Participate in social audit for measuring, understanding, reporting and ultimately improving social and ethical performance.
- Bring back Cultural and Spiritual connect with community through restoration of Water Bodies.
- Avoid dumping waste in the premises and use disposal bins.
- Report anti-social elements to the authorities through helpline number.
- Proactive role in mobilizing the community to participate in the ward level civic governance and department.

7.2 Social Audit

Social Audit forms part of the strategy to build transparency and accountability into the implementation of Water Body Rejuvenation initiative. This exercise shall be carried out with due intimation to all stakeholders involved in the implementation of Water Body Rejuvenation initiative. The preparation & approach to doing the Social Audit shall revolve around the following features-

- Preparation of a Questionnaire to capture feedback from the Local Community.
- Intimation to all Households & Stakeholders about the date & venue of the Social Audit exercise.
- Intimation to all workers to be present in the Social Audit exercise.
- Preparation of the file containing all documents – to be placed and shared in the meeting.

The exercise of Social Audit shall focus on the following aspects

- Progress of work
- Participation of Workers & Timely Payment of Wages
- Capturing impact upon the Community and Neighborhood.

Expected Outcome

- Emergence of an atmosphere of Accountability and Ownership leading to effective implementation of Water Body Rejuvenation Initiative.

8. Documentation/Record Keeping

Documentation is a vital part of Project Monitoring and Functioning. The two essential functions of documentation are to make sure that project requirements are fulfilled and to establish traceability concerning what has been done. Key points on Documentation and Record Management are elaborated below:

8.1 Drone Videography

Drone videography of Water Body to be conducted to capture the existing conditions before commencement of work. A professional agency may also be appointed to track progress as a documentary of change during subsequent phases of work.

8.2 Drawings

After approval of Detailed Project Report, each set of drawings to be handed over by Nodal Officers to the concern ULB Engineer, Implementing Partner (IP) & Interns. The drawings shall always be made available at site by front line Engineers/Interns to carryout day to day work. Any minor deviations encountered at site may be adjusted in the final As-Built drawings. However, in case of major deviations, revised drawings to be prepared by ULBs with updated Revision No. and to be recirculated to all the concern stakeholders. The latest version of drawing will supersede the previous drawing and work shall proceed as per latest version of drawings. The Nodal Officer may control the Drawing register in the below format (Table8.2) to ensure the sanity of data.

Table 8.2

Name of Water Body	Date of Issue	Title of Drawing	Drawing No.	Revision No.	No. of sets	Receiver Name	Receiver Signature

8.3 Reporting Formats (Daily/Weekly Progress Reports)

Daily and weekly status reports are communication tools that helps to keep the control on work progress and challenges. Interns of respective projects shall be guided by Nodal Officers in implementing the Daily Progress Report & Weekly Progress Report. The reports shall be circulated to all the stakeholders including WRU Advisors, Commissioners, Additional Commissioner, City Engineers/Municipal Engineers, Nodal Officers, Project Engineers, CMM, etc. The standard format for Daily Progress Report & Weekly Progress Report is attached as **Annexure-5**.

8.4 Audit

Periodical audit of Water Bodies to be conducted by respective ULB head. Preferably, audit to be conducted before and after monsoon season to check the performance of Water Bodies for their intended purpose is being fulling filled.

9. Source of Funding

There are multiple schemes under which the Urban Local Bodies can leverage funds for Water body Rejuvenation.

a) Centrally Sponsored Schemes (AMRUT 2.0, Sponge City)
b) 15th Finance Commission Funds
c) Special Funds (OMBADC, Disaster Risk Management and Climate Change Adaptation)
d) ULBs Funds
e) CSR Funds
f) PPP Projects
g) MUKTA Scheme
h) Unnati Scheme

a) Centrally Sponsored Schemes

Further, AMRUT 2.0 launched in October 2021, with a total outlay of Rs. 3300 crore project potential for Odisha out of which Central Assistance of 6% (Rs. 79.64Cr.) is allocated for Water Bodies Rejuvenation and Park Rejuvenation targets to promote circular economy of water through development of city water balance plan for each city focusing on recycle/reuse of treated sewage, of water bodies and water conservation.

b) 15th Finance Commission Funds

15th Finance Commission provide for tied grants in the critical sectors of sanitation and drinking water to ensure additional funds to the local bodies over and above the funds allocated for these purposes under the centrally sponsored schemes (CSS), Swachh Bharat and AMRUT Missions.

c) Special Funds

Funds such as District Mineral Foundation (DMF), Odisha Mineral Bearing Areas Development Corporation (OMBADC) for undertaking specific tribal welfare and area development works to ensure inclusive growth of the mineral bearing areas. As per mandate, OMBADC finance projects executed by Line Departments relating to livelihood intervention, health, water supply, sanitation, education etc.

d) Urban Local Body Funds

The ULB may also make use of funds available from its own source of revenues such as collection from tax and non-tax sources as assigned to them or devolution of shared taxes and duties as per recommendation of State Finance Commission or any other appropriate grants-in-aid from the Government of Odisha.

e) Corporate Social Responsibility (CSR)

Under the aegis of Corporate Social Responsibility, funding from private companies having diverse initiatives in collaboration with various NGOs and the government for conserving water bodies can be leveraged for water body rejuvenation programmes in the Urban Local Bodies without transfer of ownership and due permissions as per process.

f) Public-Private Partnerships (PPP)

With an emphasis on ecological waterbody rejuvenation and focus on nature-based solutions, for peripheral development and better water management and optimum usage of space PPP framework standards for efficient may be developed. The private sector should be encouraged to develop and deploy new technologies without compromising on the fundamental ecological approach defined in the SOP.

g) MUKTA Scheme

This is a state funded flagship scheme of Odisha Government aims at employment generation. Under this scheme low cost and labour oriented community based assets are created in partnership with community based organizations such as MSG & SDA. Funds can be availed under this scheme for implementation of Water Body Rejuvenation works though MSG/SDA.

h) Unnati Scheme

This is a state funded scheme of Odisha Government. Funds can be availed under this scheme for development of Urban Infrastructure including Water Bodies Rejuvenation.

10. Operation & Maintenance

The purpose of a Water Body is to improve Ground Water Recharge and help create Green Public Space and Natural Recreation Area. Operation and maintenance are those activities needed to continuously fulfill this purpose.

The difference between operation and maintenance is that operation involves activities necessary to deliver the service, while maintenance involves activities that keep the system in good operating condition.

10.1 Basic considerations for Operation and Maintenance

a) Monsoon Considerations

The O & M should address the impact of urban storm water runoff that consists of high level of sediment and other pollutant with the volume and rate of flow of runoff.

b) Preventive Maintenance

Preventive maintenance shall be carried out whereby each component of the Water Body goes through a systematic check and these components are brought into dependable use. An example can be, checking the Water Body in regular interval, cleaning, and visual inspection and retrofitting the components as and when needed. Carrying out these tasks regularly and timely shall be a preventive maintenance for the existing components. Lack of preventive maintenance finally ends up as "Chocking, Foul Smell, Degradation." Sample checklist of activities to be performed is elaborated in table 10.1.

c) O&M Manual

Site specific O&M manual to be developed and issued to the concern Maintenance officer. Manual should cover the details like Details of all the components of Water Body, As Built Drawings, Checklist of tasks to be carried out, Details of equipment installed if any, Methodology for executing tasks, Service Level Benchmarks, Expenditure plan, Monsoon Preparation, Emergency Action Plan, Record keeping, etc.

d) Ownership

- Before Rejuvenation of a Water Body a committee of passionate people from nearby community to be created who will be responsible for the upkeep of the Water Body.
- Committee of representatives from RWA/Community so formed for O&M of Water Body may engage casual labourers for maintenance of Water Body with financial assistance from ULB.
- RWA may engage representatives from the same MSGs for O&M who were associated during the construction phase.

e) Display Board

Display board to be placed at prominent location, shall contain the following information-

- Name of Water Body
- Area/Capacity of Water Body
- Date of Rejuvenation
- Estimated Cost
- History/Story of the Water Body
- Name of RWA responsible for O&M.
- WhatsApp number for lodging complaint/information/suggestion.

f) Reporting and Record Keeping

Each inspection must be documented by filling of checklist provided below. The inspection report must be produced before head of ULB for review and taking immediate further action.

g) **Complaint Redressal Mechanism**

A mobile number with WhatsApp facility to be made available with nodal officer of ULB for complaint redressal. This may be notified in the vicinity of Water Body for lodging complaint by RWA or by any visitor along with photographs. Also, Centralized Public Grievance Redress and Monitoring System on online platform to be developed by H&UD Department and made available to the citizens 24x7 to lodge their grievances to the public authorities that shall be monitored by H&UD Department.

Table 10.1

Activity	Frequency	Manpower	Materials	Tools & Equipment
Clean silt trap (if any)	Half- Yearly (Pre Monsson)	Unskilled	NA	Excavator
Cleaning Trash & Debris (if any)	Monthly	Unskilled	NA	-
Cleaning Algae	Monthly	Unskilled	NA	Excavator
Inspect of Inlet Gates & unblock when blocked (if any)	As and when required	Unskilled	NA	-

De-weeding & uproot of vegetation	Once in 45 days	Unskilled	NA	Excavator
Trimming of Shrubs & Branches of Trees on the embankment	Once in 45 days	Unskilled	NA	-
Water Sampling & Testing	Quarterly	State PH Laboratory		
Desludging	Yearly (Post Monsson)	Unskilled	NA	Excavator
Cleaning of Interconnection pipes	As and when required	Unskilled	NA	-
Cleaning & Lubrication of Inlet gates	As and when required	Unskilled	Lubricant oil	-
Inspection of Bio-Fencing & Plantation	As and when required	Unskilled	NA	-
Inspection of Aquaculture	As and when required	Unskilled	NA	-

10.2 Service Level Benchmark

Service Level Benchmarking is a key part of effective project monitoring. It will help in establishing the standards of outcome to be met and allows to monitor whether the project performance is satisfactory.

Key aspects to be monitored and their Service Level Benchmarking are as below

- Focus on water should always be given topmost priority at all stages such that water spread and water storage capacity should not be less than 80% of the water body capacity.
- Criteria for Water Quality to be met for various parameters is as below.

Designated Use	**Class of Water**	**pH Level**	**Dissolved Oxygen (DO) (mg/l)**	**Biochemical Oxygen Demand (BOD) 5 days at 20deg. C (mg/l)**	**Total Coliforms Organism MPN/100ml**	**Heavy Metals (Chromium, Copper, Cyanide, Lead, etc.) (mg/l)**
Drinking Water Source without conventional treatment but after disinfection	A	between 6.5 and 8.5	6 mg/l or more	2mg/l or less	50 or less	Chlorides-600 Cynides- 0.01 Lead- 0.1 Chromium- 0.05
Outdoor bathing (Organised)	B	between 6.5 and 8.5	5 mg/l or more	3mg/l or less	500 or less	Chlorides-600 Cynides- 0.01 Lead- 0.1 Chromium- 0.05

Drinking water source after conventional treatment and disinfection	C	between 6.0 and 9.0	4 mg/l or more	3mg/l or less	5000 or less	NA
Propagation of Wildlife and Fisheries	D	between 6.5 and 8.5	4 mg/l or more	NA	NA	NA
Irrigation, Industrial Cooling, Controlled Waste disposal	E	between 6.0 and 8.5	NA	NA	NA	NA

11. Capacity Building

Capacity-building programme involves strengthening of the skills, structures, processes of key stakeholders so that they can facilitate the sustainable water body rejuvenation. Capacity building will be targeted at any stakeholder (State & Local) that plays a role supporting Water Body Rejuvenation.

Schedule of Training

Before Construction Phase – Orientation Programme for MSGs & Interns immediately after onboarding for Water Body Rejuvenation under different ULBs.

During Construction phase – Orientation of ULBs, MSGs and Interns on different technical and non-technical aspects related to Water Body Rejuvenation, Community Mobilization in Hybrid mode as per requirement on the request of respective ULBs and plans done at State and Cluster.

11.1 Role and Responsibilities

The Roles & Responsibilities of stakeholders to Identify the training needs and address by imparting knowledge and skills through formal trainings and other supportive sessions to achieve high performance standards are as below:

Housing & Urban Development Department (H&UD)

- Approval of Training Modules.
- Facilitate Organizing Trainings and Capacity Building initiatives.
- Approval of Training Details, Experts/ Trainers, IEC material, etc.

Water Body Rejuvenation Unit (WRU)

- Facilitate approval process from H&UD.
- Facilitate need based Trainings at different levels.
- Preparation of Training calendar periodically as and when required.

Urban Local Bodies (ULBs)

- Identify a Water Champion at ULB level for Water Body Rejuvenation related activities.
- Provide need training need assessment information to WRU
- Recommend trainees for trainings.
- Collate feedback forms and provide such information in post training period.

- Logistic Arrangement (Venue, Food and Stay for participants and experts, Travel arrangement for participants) in co-ordination with WRU & H&UD.

State Urban Development Authority (SUDA)

- Preparation of Training Material & IEC material for wider dissemination of Information across all 115 ULBs in Odisha.
- Develop IEC material for help and information of trainees.
- Provide necessary on ground training support for capacity building of MSG/Women SHGs on community mobilization.
- Work in close co-ordination with WRU and H & UD from time to time on any required extra inputs to make trainings more meaningful.

11.2 Peer Learning & Exposure Visit

To provide support and strengthen continued initiatives at local level and improve the knowledge base of various stakeholders, sharing moments among similar groups would be taken up. This would not be restricted inside the state but also outside the state. WRU with the aid and advice from H & UD and experts would facilitate such exercises as and when required. This would cover both technical persons involved in planning, design, implementation at various stages but would also cover the Community groups / MSGs and Interns engaged in the process. Documentation of such exercises would be given due importance to capture the best practices from the field.

As part of experiential learning groups from different areas would be taken for exposure visit to have firsthand idea on works being at other parts of the state as well as within the country. Structured planning for the same would be done by WRU in consultation with H&UD and ULBs. Trainings can be clubbed with exposure visit so that trainees would get both theoretical and practical knowledge.

ANNEXURE-1

PRELIMINARY DATASHEET FOR SELECTION OF WATERBODIES FOR REJUVENATION

Name & Location of the Water Body: ----------

Name and Address of the Person compiling this information: ----------

General Details (Identification, Location and Jurisdiction)

Name of Water body	
Name of Municipal Area & District	
Name of Block and District	
Geographical coordinates (Latitude and Longitude in Degrees, minutes and seconds)	Latitude From ---------- to --------- Longitude From ---------- to ------
Owner of the Water Body as per RoR	

Site Characteristic

Water spread area of the water body (in ha.)		
Water body Category	Human-Made/Natural	
Pond/ Tank/ Lake /wet land		
Depth in mtr.	Average	Maximum
Elevation in mtr. (above MSL ,if available		
Hydrogeology data of the area		
Average Annual Rainfall in mm.		
Maxm. Daily Rainfall in mm.		
Temp. in centigrade	Maxm.	Min.
Humidity	Maxm.	Min.
Land cover/land use (Thickly habited/Sparsely habited/Agriculture land/Degraded forests/ Developed forest		
Soil type (Ordinary/Stoney/Black Cotton/ Clayee/Lateritic/Granite)		
Gradient /Slope (in Percentage)		
Area of zone of influence (watershed) in ha.		

Water regimes

Main Source of water (Tick all applicable)	Rainfall	Groundwater	Catchment run off	Others if any
Water Permanence (Tick all applicable)	Mostly permanent		Mostly Intermittent	

Destination of water from Water Body (Tick all applicable)	Feeds Ground water	To downstream catchment
Noticeable/predominant/plant species present in water Bodies [Plankton/Rooted/submerged/Floating]		
Noticeable/predominant/plant species present in water Bodies [Fishes/ Shrimp/ Snake/Tortoise/Frog/Zoo plankton/Migratory birds if any]		
Species for conservation significance (rare, endangered, threatened, endemic species)		

Ecosystem services

Importance	**Relevant for the site (Please tick yes or no)**	**If Yes, Details (Upto 50 words for each category)**
Source of drinking water for people living in and around	□ Yes □ No	
Source of water for agriculture	□ Yes □ No	
Fisheries	□ Yes □ No	
Cultivation of aquatic food plants	□ Yes □ No	
For buffalo wallowing and use of domesticated animals	□ Yes □ No	
Medicinal plants	□ Yes □ No	
Is a recreational site	□ Yes □ No	
Buffering communities from extreme events as floods and storms	□ Yes □ No	
Groundwater recharge	□ Yes □ No	
Water purification	□ Yes □ No	
Acts as a sink for sediments	□ Yes □ No	
Has significant cultural and religious values	□ Yes □ No	
Is a site for recreation and tourism	□ Yes □ No	
Supports noteworthy plants species	□ Yes □ No	
Supports noteworthy animal species	□ Yes □ No	
Site of high congregation of migratory water birds	□ Yes □ No	
Supports life cycle of fish or amphibians	□ Yes □ No	
Mining	□ Yes □ No	
Any other, please list	□ Yes □ No	

Pre-Existing Rights and Privileges

Nature of right and privilege	Relevant for the site (please tick yes or no)
Community Fishing (without any lease or permission from government department)	□ Yes □ No
Religious practices	□ Yes □ No
Withdrawal of water for domestic use	□ Yes □ No
Withdrawal of water for agriculture or fisheries	□ Yes □ No
Bathing or wallowing of domestic animals	□ Yes □ No
Plying of boats	□ Yes □ No
Any other, please list here	□ Yes □ No

Present and Potential Threats

Threat	**Degree**
Changes in water inflow and outflow	☐ High ☐ Medium ☐ Low
Pollution	☐ High ☐ Medium ☐ Low
Unsustainable harvest of biological resources	☐ High ☐ Medium ☐ Low
Siltation	☐ High ☐ Medium ☐ Low
Encroachment	☐ High ☐ Medium ☐ Low
Flow of Sewage	□ Yes □ No

Source of Threats

Threat	**Names of the source**
Drains opening to the Water Body (Wherefrom)	
Household (No. of Household)	
Hospital nearby (Name)	
How many drains opening up (if any)	
Is there any MCC nearby	
If so, if drains opening to the water body	
If any industries nearby (Name)	
If industrial effluents being evacuated to the waterbody	
In encroachment, please keep the info to be filled encroached by whom	
How much area, if eviction process begun	

Annexure-2

WATERBODY HEALTH SURVEY CHECKLIST (BASED ON OCULAR OBSERVATION)

Components	Indicators	Sub-Indicators	Level of Degradation (Higher % indicates higher degradation)					
PHYSICAL DIMENSION	Visible surface aquatic plants	Range (% of water body surface area covered)	0-100					
		Water hyacinth	0					
		Algae	0					
		Water fern	0					
	Solid waste in waterbody	Plastic waste	0					
		Wet garbage	0					
		Industrial effluents	0					
		Const. & demolition waste	0					
		e-waste	0					
	Solid waste in buffer area	Range	0-100					
		Plastic waste	0					
		Wet garbage	0					
		Industrial effluents	0					
		Const. & demolition waste	0					
		e-waste	0					
	Visible embankment to prevent unwanted water inflow	Range (% of waterbody circumference)	100-0					
			0					
	Visible embankment to prevent unwanted water outflow	Range (% of waterbody circumference)	100-0					
			0					
	Water colour	Range (green/brown colour)	Clear		Brownish/Greenish		Blackish	
WATERSHED (Catchment Boundary)& HYDRO-GEOLOGY	Number of bore-well in 200 mtrs range	If available, provide Approximate Figure						
	Is the Catchment boundary identifiable	Yes/No						
	Soil Type	Ordinary/Stoney/Black Cotton/Clayey/Lateritic /Granite						
	Is the waterbody interlinked with other nearby wetlands (Both Upstream and Downstream)	Provide Details from local inquiry						
	Visible point source of Liquid Waste	Range (Total Contribution %)	0-100					
		Sewer Outfall	0					
		Drain Outfall	0					

Parameters	Sub-parameters Range (% of water body surface area covered)	Field Input (%)	Ok/Error	Rounded-off		Weightage	Marks	Parameter Marks	Indicator Weightage	Indicator Score
Visible surface aquatic plants	Water hyacinth	0	ok	0	0	1	0	0	1	0
	Algae	0		0	0	0.3	0			
	Water fern	0		0	0	0.3	0			
Total		0			0					
Solid waste in water body	Plastic waste	0	ok	0	0	0.6	0	0	1	0
	Wet garbage	0		0	0	1	0			
	Industrial waste	0		0	0	1	0			
	Const. & demolition waste	0		0	0	0.4	0			
	e-waste	0		0	0	0.5	0			
Total		0			0					
Solid waste in buffer area	Plastic waste	0	ok	0	0	0.6	0	0	0.4	0
	Wet garbage	0		0	0	1	0			
	Industrial waste	0		0	0	1	0			
	Const. & demolition waste	0		0	0	0.4	0			
	e-waste	0		0	0	0.5	0			
Total		0			0					
Encroachment in waterbody area	Slum	0	ok	0	0	1	0	0	1	0
	Multi-storey buildi	0		0	0	0.6	0			
	Individual houses	0		0	0	0.4	0			
	Commercial (e.g. shops, eatery	0		0	0	0.2	0			
Total		0			0					
Liquid Waste	Sewer Outfall	0	ok	0	0	1	0	0	1	0
	Drain Outfall	0		0	0	0.5	0			
	Cattle-shed discha	0		0	0	0.4	0			
	Industrial effluent	0		0	0	0.5	0			
Total		0			0					
Religious Practices (Cummuniuty)	Idol immersion	0				1	0	0	0.4	0
	Funeral rites	0				0.5	0			
	Other (Religious practice)	0				0.4	0			
Total		0			0					

	Contamination	Cattle-shed discharge	0					
		Industrial effluent	0					
	Visible stormwater inlets	Range (Available)	Yes (from 0-4)					No (5)
	Visible stormwater outlets	Range (Availability)	Yes (from 0-4)					No (5)
LAND USE	Encroachment in buffer area	Range (% of area)	0-100					
		Slum	0					
		Multi-storey building	0					
		Individual houses	0					
		Commercial (e.g. shops, eatery, meat, etc)	0					
	Periphery development	Range (% of periphery)	0-100					
		Railing	0					
		Walkway	0					
		Landscaping	0					
		Lighting	0					
SOCIAL	Religious practices (community)	Range (Frequency)	Never	Rarely	Occassionally		Frequently	
		Idol immersion	0					
		Funeral rites	0					
		Other	0					

Water colour	Range (clear, brownish/greenish, blackish)	blackish			5			5	1	5
TOTAL SCORE										**0**

Parameter	Score	Status
VSAP+SWWB+LW	0.0	**Healthy**
All	0.0	

Health Range				
Status	VSAP+SWWB+LW		All	
	Max	Min	Max	Min
Severely Degraded		8		15
Degraded	7.99	3	14.99	8
Healthy	2.99		7.99	

Water Colour	Marks
clear	0
brownish	1
greenish	2
blackish	5

Condition of Waterbody	Marks
Healthy	less than 8
Degraded	8-14.99
Severely Degraded	15 & above

Annexure-3
Plants Recommended

Plants for Embankments (Slope)

Wedellia
Canna Indica
Vetiver
Elephant Ears
Ixora Sp
Feather Reed Grass
Fountain Grass
Switchgrass
Weeping Love Grass
Zebra Grass

Trees Bearing Flowers (Around Wetlands/Walkways)

Bottle Brush -Callistemon Sp
Cassia Fistula
Lagerstroemia Speciosa
Bauhinia Sp.
Erythrina Variegata
Millingtonia Hortensis
Butea Monosperma

Fruit Bearing Plants (Around Wetlands)

Elephant Fruits
Dillenia Indica
Litchi Chinensis
Pyros Serotina
Manilkara Zapota
Star Gooseberry

Water Logging Areas

Terminally Arjuna
Tamarix Apylla
Acacia Modesta

Biofencing

Duranta Erecta
Carrisa Carandas
Bougainvellia
Clerodendron Inerme
Jatropa Curcas
Murrya Paniculata
Plants For Floating Islands (Water Purification & Beautification)
Canna Indica

Annexure-3
Plants Recommended

Lythrum Salicaria
Phragmites
Typha Sp.

Annexure-4

Work Order

Urban Water Bodies Rejuvenation Project

Name of ULB :_____, District –_____

Work Order No..... : Date.....

To

Smt/Sri ..... (President)

Smt/Sri..... (Secretary)

Work Order is issued to ..... Slum Dweller Association / Self Help Group of Ward No. ..... Place ....., District ..... For Urban Water Bodies rejuvenation Project under Mukhya Mantri Karma Tatpara Abhiyan. The estimated cost of this project is Rs. ...../- (Amount in words.....) including 1% CESS and 18% GST.

It is mandatory to accept the instructions given in the next page.

Executive Officer

..... Self Help Group/Slum Dweller Association shall complete the work within ..... days of receiving the Work Order.

Scope of Work:

Following Works shall be taken up for Water Body Rejuvenation- Dewatering, Deweeding, Construction of Embankment, Laying of Hume Pipe, Construction of Gabion Wall, and Horticulture, etc.

Following works are to be completed in first stage from above listed work.

Engagement of labour, procurement of material, equipment & machinery and its operation required for the work will be as per guidelines provided in SOP.

Time required for implementation of project, its methodology and timeline for payment will be as per guideline provided under MUKTA scheme.

1. De-watering — Amount
   Quantity: ..... Cubic Meter — Rs. .....
   Rate@ Rs..... per Cubic Meter

2. Deweeding:
   Quantity: ..... Sq. Meter — Rs. .....
   Rate@ Rs..... per Sq. Meter

3. Desilting:
   Quantity: ..... Cubic Meter — Rs. .....
   Rate@ Rs..... Cubic Meter

Annexure-4

Total: …….. INR
Add CESS 1%: ……..INR
Add GST 18%: …… INR
Total: ……..……INR

Terms and Conditions:

1. The workorder issued to SHG/SDA by ULB shall automatically stand cancelled in case the work fails to commence within 7days from the date issue of the workorder.
2. No Advance amount shall be paid to SHG/SDA for implementation of work.
3. Entire scope of allocated work shall be completed within---------- days from date of award of this work order which the total timeframe allotted towards completion of work.
4. On satisfactory completion of work within the agreed timelines, the group may be allocated further work based on the discretion of the Authority.
5. Work execution shall be monitored to ensure weekly achievement of deliverable and overall completion of the project within the timeline as mentioned in the Work Order.
6. If there is delay in mobilization of required resources and it is observed that progress is not as per work plan/ timeline, Authority reserves the right to Terminate/Cancel the contract and/or engage other Mission Shakti Groups at the risk of the SHG originally entrusted with the work.
7. If progress of work is consistently found to be lagging against the stipulated timeline, in such cases also, in the interest of timely completion of the project, authority reserves the right to descope any part of the scope of work, or, the entire balance work and assign to other Mission Shakti Groups at the risk of the SHG originally entrusted with the work.
8. In the event and due to failure to execute as per timeline of work order as stated at (e),(f) above the concerned SHG shall be kept under wait list in ULB for next 6 Months, during which no work shall be allocated to the same SGH by the ULB under any scheme. The SHG may be considered for issue of fresh work order, if the SHG convinces the Authority of their ability to execute the works without default and upon the satisfaction of the authority.
9. Tools and materials required for implementation shall be purchased by SHG/SDA. SHG/SDA can take the help of JE/AE of the ULB for coordinating procurements and technology related activities.
10. Members of SHG/SDA shall fill up Muster roll on their own.
11. Labours shall be paid wages in accordance with the rate fixed by (Labour state employment insurance department) Govt of Odisha.
12. Muster roll filled by SHG/SDA shall be checked by JE/AE on a particular day of every week.
13. After the submission of muster rolls ULB shall credit the dues directly into the bank account of labours /SHG/SDA.
14. After that subsequently SHG/SDA shall credit the dues directly to the personal account of labours into DBT mode.
15. SHG/SDA Shall be paid 7.5% of expenditure cost as supervision charges towards monitoring of the program.

Annexure-4

16. Final payment shall be paid to SHG/SDA after submission of completion certificate duly signed by JE/AE.
17. In case you are found to be involved in any illegal activities contrary to the interest of the project, then your workorder shall be cancelled and action as deemed fit and proper in the site of law shall be initiated you.
18. In addition, it below mentioned officials can be contacted for providing additional information relating to it.

Name of Official: ……. Designation…….. Mobile No.:

To know financial details:
Name of Official: ……. Designation…….. Mobile No.:

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ମୁଖ୍ୟମନ୍ତ୍ରୀ, ଓଡ଼ିଶା

Annexure-5
Weekly Progress Report
Name of the Project

A. Project Details:

Name of the project	
Department	
Estimated cost	
Date of commencement	
Planned date of completion	
Planned duration of project	
Reporting period	
% of Time lapsed	
% of Financial achievement	
Prime executing group	

B. Major Scope of Work:

Activity	UoM	Quantity
Dewatering	Hr	
De-weeding	Sqm	
-		

C. Checklist to be followed:

Activity	Status	Responsibility
Orientation program of residents to stop dumping waste		
Scope Matrix (Dept. & MSGs) to be finalized for procurement of project materials		
Benchmark shifting along the drain		
Providing Safety PPEs to workmen		

Annexure-5
Weekly Progress Report
Name of the Project

D. Weekly Construction (Plan (P) vs Achievement(A)):

Note: Items as per project scope to be planned in below tabular form. Format to be extended for all components of project.

Inception till date			Activity	UoM	Dec-22									
					W-1		W-2		W-3		W-4		Total	
Scope	Plan	Actual			P	A	P	A	P	A	P	A	P	A
			Location											
			Baffle Tank-1											
128	128	56	Dewatering	Hr	36	24	36						72	24
3063	3063	2000	De-weeding	Sqm	531	200	531						1063	200
613	613	0	Slush Removal	Cum	613	350							613	350
613	613	0	Dismantling of Laterite	Cum	153	123	153		153		153		613	123

Annexure-5
Weekly Progress Report
Name of the Project

Note: Items to be specified as per the project requirement. Below points are only for reference.

E. Key Achievements:

F. Constraints/Challenges:

G. Areas of Improvement:

H. Site Progress Photographs:

I. Site Constraints/Challenges Photographs:

Note: Day wise photographs to be preserved. Format may be customized based on the requirement.

Annexure-5

Daily Progress Report (Detail)

Name of trhe Project

Report By | Name of TULIP | Date 20-Mar-23

Sl. No.	Reach	Location	Description of Work	UOM	Scope	Progress upto Previous Month	Planned for the month Dec'2022	Achieved in Dec'2022			Cummulative Completion	% Completion	Balance	Expected Date of Completion	Asking Rate UOM/Day	Remarks/Manpower & Machinery Details/Constraints/Issues
								Upto to previous day	For the day	Total for the month						

Note: Day wise photographs to be preserved. Format may be customised based on the requirement.