Terms of References (Indicative)

A. Background

Dhaka, the capital of Bangladesh, is surrounded by the Buriganga, Turag, Tongi Khal, Balu and Shitalakshya River, which historically shaped the city's development as a center of trade, transport, irrigation, and many other purposes. These rivers, the long considered the core of the metropolis are now burdened with a heavy pollution load from domestic, industrial, and municipal sources.

With the passage of time, these rivers have seen drastic ecological collapse due to accelerated population growth, unplanned urbanization, widespread encroachment, and the dumping of solid waste alongside untreated industrial and domestic effluent. The ecosystems in all the surface water bodies surrounding Dhaka have become severely degraded and are often considered biologically dead rivers. Restoring Dhaka's rivers and wetlands is an ecological imperative to make the city livable for millions of people and it also offers profound social, economic, and climate-resilience benefits: nature-based restoration reduces flood risk, improves water quality, supports biodiversity, creates livelihood opportunities and enhances public health and community well-being.

Balu river originates from the confluence of the Paruli and Suti rivers in Prahladpur union of Sreepur upazila. Then it flows through Gazipur, Narayanganj, Dhaka districts and falls into the Shitalakshya river near Kayetpara union of Rupganj upazila of Narayanganj district. The Balu River is a tributary of the Shitalakshya River. It runs mainly through the extensive swamps of Beel Belai and those easts of Dhaka. The Balu River is of importance mainly for local drainage and access by small boats. The Banar-Lakshya system carries partial flow of the Old Brahmaputra and receives local runoff through Banar and few others meeting at Trimohini. The combined flow further receives the flow of the Balu River near Demra. The length of the river is 44 km and average width is 60 m with maximum 130 m and minimum 20 m. The area of the river basin is 314 km^2 and it lies in old Brahmaputra Floodplain, Madhupur Tract, old Meghna Estuarine floodplain. Chilai (Gazipur), Nagda, Norai, Tongi is its tributary. The water level at Postogola in Buriganga River varied from 3.53 m to 5.25 m in wet period, whereas in dry period it varies from 1.78 m to 3.25 m. average discharge varies from 107.31 m^3/s to 239.69 m^3/s in wet period and in dry period it varies from 9.66 m^3/s to 81.16 m^3/s. It is a medium and perennial river. The river helps drain rainwater from Dhaka's eastern regions, reducing urban flooding and used as transportation medium for small boats and local trade.

The Turag River originates from the Banshi River in Kaliakoir Upazila of Gazipur District and divides into two branches in Birulia Union of Savar Upazila of Dhaka District. One branch flows into the Karnatali River in Kaundia Union of Savar Upazila and the main branch flows into the Buriganga River in Aminbazar Union. Spanning 65 km in length with an average width of 85 m (ranging from 30 m to 445 m), the Turag's basin covers 359 km^2. Adi Buriganga, Gollar (Boali), Karnatali, Lobondoho, Shaldaha (Gazipur) are its tributary rivers and Tongi khal is its distributary river. The Turag suffers from infilling along its banks, which restricts its flow. Sedimentation that reduces the flow may have begun as early as the 1950 Assam–Tibet earthquake. The average maximum flow of the river during May to October remained within 324.74 to 693.77 m3/sec, while the average minimum flow of the river during November to April remained within 12.85 to 150.59 m3/sec. It is a medium and perennial river. The river was once surrounded by agricultural land and the water was used mainly for fishing and transportation. Fishing villages on the bank of the Turag have been marginalized because of pollution.

Tongi Khal, a vital surface water system in the Greater Dhaka Watershed, connects the Turag River to the Balu River. It spans approximately 15 km, from Rustampur to Mausaid in northeastern Dhaka.The Tongi khal is heavily polluted by effluents from the nearby Tongi industrial cluster, including areas like Tongi BSCIC, Cherag Ali, Ershad Nagar, Gazipura, and Nimtoli. Over the past decades, pollution has significantly increased due to the growth of textile and dyeing industries, many of which lack functional effluent treatment plants. Flow patterns in Tongi Khal vary seasonally and are closely linked to the climate. Heavy monsoon rains reduce pollution concentration in the khal but the overall pollution load rises due to increased municipal

and agricultural runoff. In contrast, the dry season sees a sharp rise in pollution concentration due to low water flow.

The Shitalakshya river originates from the old Brahmaputra in Narsingdi district flowing through Gazipur and Narayanganj and merging with the Dhaleshwari River. The length of the river is 109 km and the average width is 200m; the length maintained by BIWTA under the Dhaka Circular Waterway is 22km. Its tributaries include the Balu River. The water of this river is severely polluted due to waste from different factories including textile and dyeing, jute mills, thermal power plants and cement factories, releasing untreated dyes, heavy metals and chemicals as well as municipal waste and untreated sewage. The water of this river is still utilized for agriculture through projects like the Rupganj North Water Conservation Project and the Narayanganj-Narsinghdi Irrigation Project. A 4.4 km walkway and barrage has been constructed from Demra Ghat in Dhaka to Shitalakshya in Siddhirganj, Narayanganj to support water management efforts.

The water of these rivers is currently severely polluted due to the Industrial Effluents; Solid Waste; Textile Dyeing Industries; Municipal and Sewerage Disposal; Heavy Metal in sediment and water; oil discharge. Textile & dyeing factories release untreated dyes, heavy metals, and chemicals. Moreover, domestic & municipal waste and untreated sewage from Dhaka city, waste of shipbreaking yards, non-biodegradable waste, encroachment & landfilling is polluting and hampering the natural flow of the river. The River and Delta Research Center (RDRC) found 237 sewage spills and 251 sewage lines in the Buriganga river, 131 spills and 99 sewage lines in the Turag river (including the Tongi khal), and 32 sewage spills and 10 sewage lines in the Balu river in 2019. Water parameters such as dissolved oxygen, BOD, COD, total alkalinity and turbidity do not comply the standards of specification Environmental Conservation Rules (ECR), 2023 standards. During the monsoon season, the water quality improves moderately, but on the advent of the dry season, pollution concentration increases abruptly because the water level of the rivers reduces a lot at this time, but the rate of pollutants released into the rivers remains identical.

Legacy pollution is one of the major problems in urban catchments. Sediments have a long residence time in an urban river system and act as a major non-point source of pollution. In a natural aquatic system, sediment can accumulate organic and inorganic contaminants discharged into water bodies. A significant part of the contaminant load in watersheds often accumulates in the sediment bed. Once sediment is contaminated, it causes lethal and sub-lethal effects in benthic and other sediment-associated organisms.

Sediment oxygen demand (SOD) plays a fundamental role in biological and chemical processes within the benthic layer of a water body. Sediment oxygen demand (SOD) refers to the rate at which oxygen is consumed by sediments, primarily due to the decomposition of organic matter and the biochemical oxidation of substances released from the sediment. It is a critical factor in aquatic ecosystems as it affects the dissolved oxygen levels in the overlying water, which is essential for aquatic life.

Restoration of rivers around Dhaka city requires improving the ecological and water quality of the rivers, sustainable and water-inclusive urban planning and land management, improving management of river flows with accommodating waterborne transportation via the rivers. The restoration of Dhaka rivers requires a multi sectoral effort at the national and sub-national levels. Integrated projects with multi-sectoral approaches combining structural and non-structural interventions are key for success.

B. Objective of the assignments

i. Overall

The project aims to formulate a holistic river restoration framework and subsequent implementation of the project for the Turag (remaining part), Balu River, Tongi Khal Shitalakshya River. It will include the process of legacy pollutant removal with a sustainable disposal management plan, ecological restoration plan and development plan of recreational amenities along riverbanks.

ii. Specific

The specific objectives of the study are as follows:

- Develop an integrated, eco-friendly framework for riverbed cleanup combining legacy pollutant removal with safe disposal or reuse strategies;
- Design a comprehensive framework to improve water quality which integrates nature-based approaches to support aquatic life and safe human interaction;
- Develop a plan for eco-buffer zones along the rivers periphery to reduce illegal encroachments, reclaim original river boundaries, walkways, eco-parks, green spaces and provide recreational amenities;
- Restoration plan for degraded riverine ecosystems by the re-establishment of native flora and fauna while ensuring the long-term ecological sustainability and biodiversity of the rivers and their surrounding environments.

This preparatory study will support the implementation of the activities included in the phase-1 of the project.

C. Scope of services

The activities and the scope of work for the assignment are as follows (but not limited to):

i. Literature Review & Data collection:

- Collect and review existing maps, satellite images, and technical reports (e.g., DAP, drainage/sewerage master plan), alongside secondary datasets such as bathymetry, surface/groundwater, sediment/discharge measurements, soil samples, water quality data etc.;
- Collection of mouza maps and detailed mapping of river and its tributaries, distributaries and linkage canal and cross section data;
- Review relevant environmental rules, acts, policies and regulation for compliance by key stakeholders;
- Conduct field bathymetric survey to collect data including river cross-section, embankment section, topography, water level, discharge and sediment concentration;
- Conduct Bed Material sample to measure legacy Pollutant;
- Demarcation of original rivers and present position of the rivers;
- Water and soil quality sampling rivers for laboratory testing;
- Install and maintain water level gauges at critical pollution points;
- Review the analysis of different flood and drainage management scenarios based on future land use pattern and climate change condition in conjunction with improvement of water logging in the mentioned areas;
- Preparation of Base map;
- Review of the study project titled “Feasibility Study on Integrated Development of Goranchatbari Retention Pond in Dhaka City”.

ii. Assessment of hydro-morphologic characteristics, and model development:

- Review of hydrological and hydro-morphological model developed in the study “Feasibility study on Integrated Development of Goranchatbari Retention Pond in Dhaka City” (Phase-1);
- Develop and update rainfall-runoff model, calibration and validation;
- Simulation of hydrological and hydraulic model to optimize proposed structures;
- Develop water quality model and give the analysis with project and without project condition;
- Development, calibration, and validation of 1D Hydrodynamic (flooding and drainage) and 2D (morphological and sediment transport) models; Simulation of hydrological and hydraulic model for different design hydrological events for both without and with project conditions considering climate change scenario;
- Assess sedimentation rate, deposited volume, sediment distribution, the overall contribution of sediment from the entire basin, develop a comprehensive sedimentation management plan;
- Digitize river networks and demarcate the extent of the rivers during monsoon and dry seasons;
- Assess required water retention capacity to support sustainable river ecosystems and maintain riverine biodiversity;
- Preparing a risk map of the urban areas considering extreme rainfall.

iii. Water Quality and Dredged Material Assessment

- Direct sampling and testing of bed material and classification of that bed material and listing of composition;
- Distribution of Biodegradable and Non-biodegradable legacy pollutant from the bed material;
- Calculate the amount of legacy pollutant from the river bed;
- Distribute the legacy pollutant with chemical composition;
- Demarcate the river boundary from C/S, R/S, B/S, City Survey etc.;
- Direct sampling and testing of various water quality parameters including required biological indicators (DO, BOD, COD, heavy metals (Ar, Cr, Pb, Co, Hg], TSS, TDS, pH, NH_3, NO_3, TN, TP, oil, grease, total coliform, fecal coliform etc.; and biological indicators such as green algae, chlorophyll, representative fish species, aquatic plants, or other species etc. as required);
- Selection of appropriate chemical, biological indicators for the study area to qualitatively describe river's water quality status as good, medium or poor which would be based on different water quality quantitative parameters (i.e. DO, TP, TN, PH, NH_3, NO_3 etc.);
- Review the water quality standards in light of the project objectives and set the water quality target level;
- Identification of point and non-point sources of pollutants in the study area and provide concerned recommendation to prevent the issue;
- Investigation of the possibility to separate the sewerage and any other effluent from entering to the rivers and identify industrial facilities failing to comply with environmental regulations, particularly those that lack installed or operational Effluent Treatment Plants (ETPs);
- Review different treatment options (chemical treatment, mechanical treatment) for effluent, sewerage and other pollutants. as well as ecological approaches for water quality improvement as biological means will be thoroughly reviewed based on literatures and past implemented projects around the world;
- Review sustainability of the selected water quality enhancement approaches;
- Assessment of probable future water quality situation due to urbanization, land use changes and proposed development.

iv. Development different options of infrastructure plan and Design:

- Preparation of flow distribution map, river conveyance map, flood plain identification, and danger level fixation.
- Identify illegal encroachment and prepare a strategic evacuation plan;
- Assessment of land acquisition for establishing/restoration of rivers and preparing LAP & RAP;
- Planning and design of flood, water, and river management measures for each river separately and also in an integrated way for short, medium and long term investment plan;
- Design proposed intervention for recommended structures re-excavation, small water control structures, drainage structures, pipe sluice etc. that would be identified through the study.
- Preparation of legacy pollutants removal and sustainable disposal management plan for (Buriganga, Turag, Balu river and Tongi Khal)
- Determine the volume, distribution, and types of pollutants, then select appropriate disposal methods and sites based on environmental criteria, regulatory compliance, and best available technology
- Preparation of Master plan:
  - landscape planning of the project area considering opportunity for developing eco-tourism & recreation facilities
  - Preparing detailed land acquisition plan required for the proposed infrastructures & recommendations
  - To establish the connectivity between proposed interventions and existing communication network.
  - Design of eco-friendly walkway, wooden sitting deck, river view deck, observation tower, nature-based amphitheater, rest room, food court, kids play zone with minimum use of concrete, plastic, etc.

- Review of the design for the proposed interventions mentioned in the study "Feasibility study on Integrated Development of Goranchatbari Retention Pond in Dhaka City" and provide recommendation on the proposed design;
- Identify existing navigation facilities and study potential of improving navigation through creating interconnecting links between the rivers/khals and its maintenance plan;
- Integration of the development plans and works proposed in the study "Feasibility study on Integrated Development of Goranchatbari Retention Pond in Dhaka City" (Phase-1) with the planning of other relevant agencies such as, GCC, NCC, DWASA, DNCC and DSCC.
- Review and recommendation on activities regarding procurement for Phase-1.
- Prepare documents regarding procurement for Phase-2.

v. Environmental and Social Impact Assessment

- Establishment of physical, environmental and social baseline condition;
- Conduction of ecological survey to assess present situation of fisheries, aquatic ecosystem and relevant stakeholder considering both environmental and socio-economic effects;
- Assessment of environmental flow of the study area;
- Evaluate approaches for legacy pollutant remediation and risk assessment;
- Preparation of bio-diversity conservation plan, environmental monitoring, enhancement and conservation plan;
- Re-establishment of native flora and fauna, improving habitat quality, and ensuring the long-term ecological sustainability and biodiversity of the rivers and their surrounding environments;
- Assess afforestation needs, selection of appropriate trees species for riparian vegetation zones (between high and low water levels) considering landscaping, aquatic and terrestrial ecosystem, birds' habitat, etc. and selection of appropriate trees species between road and walkway (wood, fruit, floral etc.);
- To strengthen institutional capacity within the implementing agency and its partners for sludge mapping, safe disposal, and monitoring, with technical support and collaboration from the well-recognized institutions specializing in water and environmental studies like IWM, CEGIS, BUET, WARPO, DU, DPHE, BARI and regulatory authorities like DoE;
- Determine the individual work of the agencies according to business of allocation;
- Conduct stakeholder consultation on dredged material disposal methods;
- Prepare social and environmental safe-guard policy according to World Bank and GoB guideline;
- Development of Environmental Management & Monitoring Plan;
- Social Impact Assessment (SIA) study due to implementation of the project interventions;
- Review of the design for the ESIA done in the study "Feasibility study on Integrated Development of Goranchatbari Retention Pond in Dhaka City" (Phase-1) and provide recommendation on the ESIA for improvement;
- Assessment of future development of agriculture, fisheries, navigation, urbanization etc.;
- Preparation of approval of ESIA ToR from DoE and make reports to take Environmental Clearance Certificate from DoE

vi. Economic and Financial Analysis

- Comparative economic analysis of the recommended legacy pollutants removal and sustainable disposal management
- Comparative economic analysis of the recommended water quality enhancement option with traditional methods;
- Preparation of detailed cost estimate of the candidate projects as per DPP format on the basis of recent actual schedule of rates in the short-term investment plan;

- Preparation of qualitative cost estimate of the candidate projects as per DPP format in the medium and long-term investment plan;
- Estimation of Benefits to be derived after implementation of the proposed project;
- Estimation of BCR, EIRR, NPV of each planning option based on the with and without project situation;
- Detailed financial and economic analysis.

vii. Workshops and Reports

- Workshop and consultation meetings for disseminating the study results to relevant stakeholders;
- Preparation of Inception Report, Interim, Draft Final and Final feasibility study report according planning commission and World Bank format compiling the technical, social, environmental and economic aspects;
- Preparation of ESIA Report according to World Bank and GoB guideline.

viii. Expected Outputs

- Volume, distribution, and types of pollutants;
- River restoration framework;
- Legacy pollutants removal and disposal management plan;
- Water and environment quality improvement strategy;
- Ecological restoration plan;
- Landscape planning considering development of eco-buffer zone and recreation facility;
- Implementation plan for river restoration;
- List of the point source pollution at the project area and suitable recommendations to prevent pollution;
- Flow Distribution Map, River Conveyance Map, Flood Risk Map and pollution Map;
- Master plan including Flood & Drainage management plan and landscape planning considering development of eco-buffer zone and recreation facility;
- Ecological restoration plan by re-establishing native flora and fauna;
- Encroachment removal and river bank reclamation plan;
- Detailed design of all the proposed interventions;
- Recommendation on the different developed models and design prepared for the study "Feasibility study on Integrated Development of Goranchatbari Retention Pond in Dhaka City" (Phase-I);
- Land acquisition plan (LAP) and resettlement action plan (RAP) etc.;
- A comprehensive long-term solution for the flood-drainage-sedimentation problem of the area considering the development initiatives of other sectors;
- Bio-diversity conservation plan, environmental monitoring, enhancement and conservation plan;
- Social and environmental safe-guard policy according to World Bank and GoB guidelines;
- ESIA study reports with WB standard guideline;
- Environmental and Social baseline condition of the project and ESIA of proposed interventions;
- Environmental Management Plan (EMP), which should include:
    - ❖ Mitigation Plan
    - ❖ Enhancement Plan
    - ❖ Compensation Plan
    - ❖ Environmental Monitoring Plan.
- Data set containing collected/surveyed cross-section information and others;
- Economic analysis of the integrated development Plan.
- Detailed cost of the project with economic and financial analysis.
- B/C ratio, EIRR, Cost Estimates of the proposed interventions.
- Cost estimate of the project works as per DPP format.

- Feasibility Study report (Prescribed Feasibility study report format of Planning Commission and World Bank guideline).
- Recommendation on activities regarding procurement for Phase-1 and documents regarding procurement for Phase-2.

Any other, as deemed to be necessary, in compliance with the Scope of Works.

Expected Output and Outcome:

Output

- River restoration framework;
- Legacy pollutants removal and disposal management plan;
- Water and environment quality improvement strategy;
- Ecological restoration plan;
- Landscape planning considering development of eco-buffer zone and recreation facility;
- Recommendation on the developed different models and proposed design in the Phase-1 study;
- Implementation plan for river restoration.

Outcome

A holistic river and ecological restoration framework including landscape planning and facilitate recreational amenities to improve human livelihood.

Monitoring, Evaluation and Reporting:

A Project Steering Committee (PSC) under chairmanship of Secretary of Ministry of water resources and a project Implementation committee under Chairmanship of Director General of BWDB will monitor the TAPP. The decision of meeting will help to implement the TAPP.

Reports for Assignment Overall

The duration of the study is 18 months. The following are the reporting schedule for submission of the study reports in color prints as where necessary.

Sl. No.	Report	No of copies	Schedule
1	Inception Report	20 copies	At the end of 2 month
2	Quarterly Progress Report	20 copies	At the end of every 3 months
3	Interim Report	30 copies	At the end of 12 months
4	Draft Final Report including project plan for the Implementation Phase	30 copies	At the end of 16 months
5	Final Report	30 copies	At the end of 18 months

Man Month of the Professionals for Consultancy Service based on Indicative activities

Sl . No.	Positions	No. of Professional (Nos)	Input- Staff-month (man-month)	Total Man-month
1	*2*	*3*	*4*	*5*
1	Team leader	1	15	15
2	Deputy Team Leader	1	12	12
3	Water Quality Modeler	1	12	12
4	Landscape Planner/ Architect	1	12	12
5	Legacy Pollution Management Specialist	1	12	12
6	Dredging and dredge material lManagement Specialist	1	8	8
7	River Engineer Cum Morphologist	1	8	8
8	Hydrologist cum climate change Specialist	1	8	8
9	Senior Design Engineer	1	6	6
10	Hydrodynamic Modeler cum Flood Management Specialist	1	8	8
11	Environmentalist	1	8	8
12	Procurement Specialist	1	3	3
13	Community and Occupational Health & Safety Specialist	1	6	6
14	Ecologist cum Biodiversity Expert	1	8	8
15	Sociologist	1	6	6
16	Environmental Disaster management Specialist	1	5	5
17	Gender and SEA/SH Specialist	1	5	5
18	Land Acquisition & Resettlement Specialist	1	5	5
19	Economist	1	5	5
20	GIS Expert	1	6	6
21	Survey Specialist	1	6	6
22	Field Researcher/Junior Engineer	6	6	36
	Total	27		200

Qualifications, Experiences and Responsibilities of Consultant(s

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	2	3	4	5	6	7
1.	Team leader	1	Masters' degree in Environmental /Civil/Water Resources Engineering/Agri Engineering/ River/ Coastal Engineering or equivalent field. Higher Degree in relevant field is preferable.	20 years professional experiences including 15 years experiences in river engineering, water resources management and Planning, field execution and leading of such projects.	• Task: His/her major task includes but not limited to the following: • Guide and supervise the study team in carrying out the study programme; • Review and make necessary recommendation the study of Goranchatbari Retention Pond in Dhaka City" (Phase-I) • Responsible for formulating strategy for data collection and processing; • Assess and update existing river boundary maps, review demarcation regulations, and identify illegal encroachments to inform targeted enforcement and restoration strategies. • Organise interaction meetings with local stakeholders and BWDB officials and workshop to disseminate study results; • Responsible to supervise the Inception, Interim, Progress, Draft Final and Final reports along with other documentation; • Carry out overall co-ordination and maintain close liaison with the client; • Attending meeting as and when required.	
2.	Deputy Team Leader	1	Masters' degree in Environmental /Civil/ Water Resources Engineering/ Agri Engineering/ River/Coastal	15 years professional experiences including 12 years experiences in river engineering, water	• Guide and manage the study team in carrying out the study programme; • Assess and update existing river boundary maps, review demarcation regulations, and identify illegal encroachments to inform targeted enforcement and restoration strategies.	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**
			Engineering or equivalent field. Higher Degree in relevant field is preferable.	resources management engineering and Planning, field execution and leading of such projects.	• Responsible for formulating strategy for data collection and processing; • Organise interaction meetings with local stakeholders and BWDB officials and workshop to disseminate study results; • Responsible to contribute in the Inception, Interim, Progress, Draft Final and Final reports along with other documentation; • Carry out overall co-ordination and maintain close liaison with the client; • Attending meeting as and when required.	
3.	Water Quality Modeler	1	Masters' degree in Environmental /Civil/ Water Resources Engineering or equivalent field. Higher Degree in relevant field is preferable.	15 years of professional experiences including 10 years' experience in relevant field of water resources planning, water quality management in water resources management projects.	**Task:** His/her major task includes but not limited to the following: • Review of the past studies on wastewater treatment; • Review and make necessary recommendation the study of Goranchatbari Retention Pond in Dhaka City" (Phase-I) • Assessment of the water quality of the study area; • Assessment of the probable future water quality due to driving forces such as land use change and climate change, etc.; • Review of different treatment options for the improvement of water quality in the study area; • Assessment of applicability and design of ecological engineered approaches for water quality enhancements; • Comparison of the alternative plans for treatment; • Review and develop biological indicator-based water quality monitoring approaches; • Assist in report writing and presentation.	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	2	3	4	5	6	7
4.	Landscape Planner/ Architect	1	BSc in Architecture or equivalent field. Higher Degree in relevant field is preferable.	15 years of professional experiences including 10 years' experience in relevant field of planning and design of different architectural components of recreational, tourism, buildings, park, etc. features	**Task:** His/her major task includes but not limited to the following: • Review of the existing comprehensive plan of BWDB in four rivers • landscape planning of the project area considering opportunity for developing eco-tourism & recreation facilities • Identification of land requirements. • Contribute in report writing.	
5.	Legacy Pollution Management Specialist	1	Masters' degree in Environmental /Civil/Water Resources Engineering or equivalent field. Higher Degree in relevant field is preferable.	15 years of professional experiences including 10 years' experience in relevant field of water resources planning, waste water management, legacy pollutant management in water resources management projects.	**Task:** His/her major task includes but not limited to the following: • Site investigation and conduct a comprehensive assessment of legacy pollutants • Distribution of Biodegradable and Non-biodegradable legacy pollutant from the bed material; • Calculate the amount of legacy pollutant from the river bed; • Distribute the legacy pollutant with chemical composition; • Prepare the distribution, concentration and types of legacy pollutants and risk evaluation • Select optimal treatment systems based on contaminant type, site conditions, and environmental goals. • Supervise and coordinate teams during remediation efforts. • Provide policy advice and guidance on legacy pollutant regulations and cleanup standards.	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	2	3	4	5	6	7
6.	Dredging and dredged material Management Specialist	1	Masters' degree in Environmental /Civil/Water Resources Engineering or equivalent field. Higher Degree in relevant field is preferable.	15 years of professional experiences including 10 years' experience in project related field	**Task:** His/her major task includes but not limited to the following: • Devise spoil management strategies • Specify containment or disposal solutions • Review and make necessary recomendation the study of Goranchatbari Retention Pond in Dhaka City" (Phase-I) • Monitor dredge positioning, spoil placement, equipment selection, and staging logistics • Identify environmental and operational risks and integrate mitigation strategies into spoil management planning • Fixing the dredging alignment, design and estimating the volume of capital and maintenance dredging if needed; • Preparation of dredged material management plan	
7.	River Engineer Cum Morphologist	1	Bachelor degree in Civil/ Water Resources Engineering/ River/ Coastal Engineering or equivalent field. Higher Degree in relevant field is preferable.	15 years of professional experiences including 10 years' experience in project related field	**Task:** His/her major task includes but not limited to the following: • Guiding in developing, calibrating and validating, updating and improving available water flow and morphological models • Responsible for simulation of morphological conditions of rivers for impact assessment of various future development strategies in the river basins basin and their impacts. • Medium and long-term morphological simulations • Assessment of impact of climate change on river morphology for medium and long-term perspective	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**
					• Responsible for making a comprehensive river management plan • Responsible for formulation of specification and strategy for data collection and processing and planning of improvement measures • Devising of the dredging requirements on the basis of the recent bathymetry of the channel and the design criteria of the navigation channel • Development of different dredging plan and assessment of effectiveness for identification of area to be dredged for navigability • Selection of the dredged material disposal methodology and location so that the dredging activities does not affect the environment and ensure beneficial use of the dredge materials • Development of monitoring plan for quality control of the dredging and its performance	
8.	Hydrologist cum climate change Specialist	1	BSc in Civil/ Water Resources Engineering/ River/ Coastal Engineering or equivalent field. Higher Degree in relevant field is preferable.	15 years of professional experiences including 10years' experience in hydrological data analysis, hydraulic modelling for the riverine environment, experience of updating of regional model of Bangladesh	**Task:** His/her major task includes but not limited to the following: • Development of hydrological characteristics of river system using historical data and hydrodynamic model results; • Review and update of hydrological and hydrodynamic model for the study area; • Simulation of hydrodynamic model for different options scenarios; • Develop, calibrate and validate rainfall-runoff models of the project area. • Develop, calibrate and validate hydrodynamic model of the study area.	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**
					• Simulate models for different options/scenarios and hydrological event. • Assess the flooding and drainage extent under the project. • Participate in report writing and presentation. • Attend meeting, workshops, etc. as and when required. • Assist team leader as and when required regarding flood and drainage modelling issue.	
9.	Senior Design Engineer	1	BSc in Civil Engineering/ Water Resources Engineering or equivalent field. Higher Degree in relevant field is preferable.	15 years of professional experiences including 10 years' experience in planning and design of hydraulic structures, selection of structures site, cost estimate etc.	**Task:** His/her major task includes but not limited to the following: Selection of suitable sites of the proposed interventions. • Design of recommended structures re-excavation, small water control structures, drainage structures, pipe sluice etc. that would be identified through the study. • Review and recommend structures of Goranchatbari Retention Pond in Dhaka City" (Phase-I) • Assess related data collection need. • Preparation of cost estimate of the proposed structures • Assists in the preparation of different reports. • Assist in preparing cost estimate following the DPP format. • Any other tasks assigned by the Team leader	
10.	Hydrodynamic Modeler cum Flood Management Specialist	1	BSc in Civil/ Water Resources Engineering/ River/ Coastal Engineering or equivalent field. Higher	15 years of professional experiences including 10 years' experience in	**Task:** His/her major task includes but not limited to the following: • Rainfall-runoff analysis and development of River drainage model	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	2	3	4	5	6	7
			Degree in relevant field is preferable.	project related field	• Hydrological analysis and establishment of design flood event • Development of drainage model for different scenarios to find out design parameters for the interventions • Assess effectiveness of different interventions for drainage improvement using numerical model • Development of hydrological characteristics of river system using historical data and hydrodynamic model results • Development of several options for flood control and drainage improvement	
11.	Environmentalist	1	Masters' degree in Environmental Science or Equivalent field / BSc in Civil/Water Resources Engineering or equivalent field. Higher Degree in relevant field is preferable.	15 years of professional experiences including 10 years' experience in the field of environmental studies including EIA of water resources management projects.	**Task:** His/her major task includes but not limited to the following: • Carry out field visit, consult with stakeholders, and understand the project area. • Maintain close interaction with planning engineer and other team members of different disciplines. • Review and make necessary recommendation the study of Goranchatbari Retention Pond in Dhaka City" (Phase-I) • Prepare environmental data collection plan and guide team leader to collect them. • Review different treatment options (chemical treatment, mechanical treatment) for effluent, sewerage and other pollutants. as well as ecological approaches for water quality improvement as biological means will be thoroughly reviewed based on literatures	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	2	3	4	5	6	7
					and past implemented projects around the world. • Investigation of the possibility to separate the sewerage and any other effluent from entering to the rivers and identify industrial facilities failing to comply with environmental regulations, particularly those that lack installed or operational Effluent Treatment Plants (ETPs). • Collect socio-economic, fishery, agriculture, ecology and other relevant data and information from respective professionals of the study team. • Conduct ESIA study following DoE guidelines. • Prepare the ESIA report including EMP in accordance with DOE and WARPO's guidelines. • Present ESIA report to BWDB for comments. • Contributing in the report writing. • Assist team leader as and when required regarding environmental issue. • Attend meeting, workshops, etc. as and when required;	
12.	Procurement Specialist	1	B. Sc. Degree in Civil Engineering/ Water Resources Engineering /Hydraulics Engineering or equivalent degree. Higher Degree in	15 Years professional experiences with at least 12 years working experience in processing the procurement of goods, works and services, following	**Task:** His/her major task includes but not limited to the following: • Review and recommendation on activities regarding procurement for Phase-1. • Prepare specifications/terms of reference for procuring all kind of goods, equipment, works and services in accordance with the policies and guidelines.	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	2	3	4	5	6	7
			procurement is preferable.	GOB and development partner(s) procurement guidelines.	• Prepare documents regarding procurement for Phase-2. • Prepare bidding documents and assist BWDB in development of the project's procurement plan. • Ensure compliance with national and development partner(s) procurement guidelines. • Oversee supplier performance and contract implementation. • Handle procurement records, prepare reports on procurement status and risks, provide training to project officials, and resolve procurement-related issues. • Assist in preparation of different reports as required by the Team Leader and PD.	
13.	Community and Occupational Health & Safety Specialist	1	Bachelor degree in Occupational Health and Safety/ Environmental Health/ Industrial Hygiene/ Public Health/ Nursing or Health Sciences/ Environmental Science (with health & safety focus) or a related scientific or technical field such as engineering, biology,	12 years of professional experiences including 8 years of working experience in relevant field.	**Task:** His/her major task includes but not limited to the following: • Recommendation on activities that may pose threats to workers' health or safety. • Investigate any accidents to identify causes or to determine how such accidents might be prevented in the future • Recommend measures to help protect workers from potentially hazardous work methods, processes, or materials. • Review and make necessary recommendation the study of Goranchatbari Retention Pond in Dhaka City" (Phase-I) • Inspect or evaluate workplace environments, equipment, or practices to ensure compliance with safety standards and government regulations.	

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1	2	3	4	5	6	7
			Public health or chemistry.		• Investigate the adequacy of ventilation, exhaust equipment, lighting, or other conditions that could affect worker's health, comfort, or performance. • Conduct safety training or education programs and demonstrate the use of safety equipment. • Test facilities for environmental hazards. • Collaborate with engineers or physicians to institute control or remedial measures for hazardous or potentially hazardous conditions or equipment. • Collaborate with healthcare professionals to plan or provide treatment. • Develop or maintain medical monitoring programs for workers. • Maintain or update emergency response plans or procedures. • Coordinate and overview of the OHS related activities in all the components of the project • Develop procedures in case of emergency situation. • Prepare hazardous, radioactive, or mixed waste samples for transportation or storage by treating, compacting, packaging, and labeling them. Any other task assigned by the project director and reportable to the project office	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	2	3	4	5	6	7
14.	Ecologist cum Biodiversity Expert	1	Master's degree in Ecology/Environment/Fisheries/ Botany/Zoology or equivalent field. Higher Degree in relevant field is preferable.	15 years of professional experience having 10 years of working experience in determining the relationship between plants, animal and environment and also report on the likely impacts of the proposed intervention in the water management-based projects.	**Task:** His/her major task includes but not limited to the following: • Assessing ecology of any species of conservation significance or concern such as breeding/spawning behaviors and seasons, migratory patterns, food sources, predators, sensitivity to pollution. • identification of valued environmental components • Design and develop methodology along with collection, compilation and analysis of data related to biological resources in river and terrestrial resources; • Establish baseline condition of terrestrial resources and aquatic resources • Re-establishment of native flora and fauna, improving habitat quality, and ensuring the long-term ecological sustainability and biodiversity of the rivers and their surrounding environments; • Assess afforestation needs, selection of appropriate trees species for riparian vegetation zones (between high and low water levels) considering landscaping, aquatic and terrestrial ecosystem, birds' habitat, etc. and selection of appropriate trees species between road and walkway (wood, fruit, floral etc.) • Recommend measures to offset negative impacts; Responsible for Preparation of river Environmental Management Plan (EMP) for the river basins/catchment on the basis for the detailed Environmental Impact	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**
					Assessments (EIA), mitigation measures and monitoring plan.	
15.	Sociologist	1	Masters' degree in Sociology /Social Science or equivalent field. Higher Degree in relevant field is preferable.	12 years of professional experience including 8 years of working experience in sociological activities & field survey, i.e. interaction with the stakeholders, holding Focus Group Discussion (FGD), Target Group Discussion (TGD) and work-shops/seminars at field level to find out the desired goal of the study and to disseminate the results of the study	**Task:** His/her major task includes but not limited to the following: • Intensive Field visit for collecting views of the local people, their present socio-economic activities and problems including present situation in the vicinity of Project Area; • Holding interaction meeting with the stakeholders at field level holding Focus Group Discussion (FGD), Target Group Discussion (TGD) and workshops/seminars at field level to find out the desired goal of the study and to disseminate the results. • Find-out the conflicting issues, conduct motivational works among the stakeholders against any negative issue and to suggest mitigation measures. • Assist the study team in holding seminars, workshops.	
16.	Environmental Disaster management Specialist	1	Masters' degree in Environmental Science / Disaster Management or Equivalent / BSc in Civil/ Water Resources Engineering or Equivalent	12 years of professional experiences including 8 years' experience in project related field	**Task:** His/her major task includes but not limited to the following: • Assess the baseline environmental condition • Assess the potential impacts of the project activity on surrounding environment • Review and Implementation of EMP for the project • Provide guidance and oversight to ensure compliance.	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	2	3	4	5	6	7
			field. Higher Degree in relevant field is preferable.		• Implement and maintain the site security management system, as applicable. • Defines and monitors actions to improve EHS performance. • Monitor the effectiveness of the site related rules defined in the Site EHS plan and revise as necessary to keep up to date, in consultation with the Project Director and Site Manager. • Ensure appropriate actions are taken in the event of non-compliance. • Provide timely information to the site management in relation to any trends that become evident through analysis. • Ensure effective implementation of the site risk assessment process. • Ensure that all EHS events are reported, recorded and analyzed. • Ensure full implementation of a just and fair culture in terms of reward and discipline at site. • Advise site management on potential legal exposure and EHS concerns. • Implement and maintain effective emergency plans, security programs and site access control procedures • Assist in preparation of different reports as required by the Team Leader and PD	
17.	Gender and SEA/SH Specialist	1	Master's degree in social science, development studies, or Equivalent field. Higher Degree in	12 years of professional experiences including 8 years' experience in project related field	**Task:** His/her major task includes but not limited to the following: • Ensure the Gender Equality and Female Empowerment Policy are applied throughout the activity • Identify possibility of Sexual Exploitation & Abuse (SEA)/Sexual Harassment (SH)	

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1	2	3	4	5	6	7
			relevant field is preferable.	Experience with Development Partners project is preferred.	occurrence in workplace • Prepare SEA/SH risk mitigation and response action plan • Work with project staff to ensure gender is appropriately integrated in all trainings • Strategize methods to monitor instances of gender disparities and gender-based violence • Integrate gender analysis and propose additional or alternative measures of gender-related outcomes and impact for all MEL work supported by the contract • Document successful activities and methodologies for gender integration • Prepare a guideline for reporting any incidence of SEA/SH • Provide training regarding mitigation of workplace harassment and sexual abuse • Build awareness about relevant laws of Bangladesh and relevant policy, guidelines of World Bank or other development Partner. • Other tasks contributing to meeting gender equity and women's empowerment targets and goals	
18.	Land Acquisition & Resettlement Specialist	1	Masters' degree in Sociology /Social science or equivalent field. Higher Degree in relevant field is preferable.	12 years of professional experiences including 8 years' experience in resettlement, field level Consultation and Communication, monitoring and evaluation	**Task:** His/her major task includes but not limited to the following: • Identify the layout of the works in terms of land ownership (private, Khash etc) by land use. • Collect of Mouza maps and digitize them with the assistance from the GIS Expert. • Review and make necessary recommendation the study of Goranchatbari Retention Pond in Dhaka City" (Phase-I)	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	2	3	4	5	6	7
				and/or other relevant fields. Previous successful engagement with, and good Knowledge of, CBOs, I/NGOs and civil society is desired.	• Prepare the land acquisition plans and proposals. • Identify area suitable for afforestation/social forestation. • Identification of proposed suitable location for construction works. • Review the SMRPF and the applicable legal and policy guidelines related to land acquisition and population displacement due to the project interventions. • Review project design, boundaries of project interventions and implementation schedule. • Design and carry out stakeholders' consultation including focused group discussions for collecting local information on social condition, cultural values, and inputs for RAPs. • Design survey for identification of lands for acquisition, inventory of losses and Project Affected Persons, and for valuation of affected assets. • Review SIA and prepare RAP for each site. • Review RAPs and design RAP implementation supervision plan. • Review project design, boundaries of project interventions and implementation schedule. • Assist in preparation of different reports as required by the Team Leader and PD	
19.	Economist	1	Master's degree in Economics/Agricultural Economics or	12 years professional experiences or more includes 8 years' experience in	**Task:** His/her major task includes but not limited to the following: • Assess economic impacts and suggest mitigation and	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**
			equivalent field.	collection, computation & analysis, evaluation of flood management, drainage & water resource project.	enhancement measures due to the proposed project. • Comparative economic analysis of the recommended legacy pollutants removal and sustainable disposal management • Comparative economic analysis of the recommended water quality enhancement option with traditional methods; • Elaboration of the feasibility level cost estimates, contingency amounts, detailed price escalation etc. • Estimate BCR, EIRR, NPV, sensitivity analysis and other economic parameters of project assessment. • Preparation of qualitative cost estimate of the candidate projects as per DPP format in the medium and long-term investment plan • Prepare annual expenditure schedule. • Contribute in report writing. • Attend meetings, workshops as and when required. • Assist team leader and planning engineer as and when required	
20.	GIS Expert	1	BSc in Civil/ Water Resources Engineering/ Urban and Regional Planning/Master in Geography or Equivalent field.	10 years professional experience including 7 years of working experience in preparing GIS coverage; GIS Maps, Digital Elevation Models etc.	**Task:** His/her major task includes but not limited to the following: • Collect previous GIS maps in the study area and analyse the previous conditions; • Preparation of all types of GIS based maps including data collection, required maps for modelling, analysis results of project area and difference maps of bed topography; • Preparation of study/basin area maps with all the relevant features; • GIS and Remote sensing Data collection and analysis	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**
					• Perform spatial data analysis required for the study. • Preparation of maps for workshops and reports. • Land use and land cover map preparation.	
21.	Survey Specialist	1	BSc in Civil/ Water Resources Engineering or equivalent field.	10 years professional experiences including 7 years' experience in hydrographic, topographic and hydrometric survey and knowledge on using DGPS, RTK, ADCP, Drone, Hydro-pro, Arc-view, and other technology like Terra model for processing surveyed data	**Task:** His/her major task includes but not limited to the following: • Prepare survey plans; • Field survey for topography, bathymetry, sediment, water level and discharge data; • Preparing detailed specification for all field survey activities; • Supervise the survey activities; • Ensure the quality of the survey; • Guide in processing and analyzing the data; • Preparation of Survey Report.	
22.	Field Researcher/Junior Engineer	6	BSc in Civil/ Water Resources Engineering or equivalent field.	5 years of professional experience including 03 years of working experience in analysis of different types of water resources management related data including sediment, discharge, water level,	**Task:** His/her major task includes but not limited to the following: • Responsible for the collection of field data and data from different organizations. • Ensure data quality and prepare data needed for hydrological and morphological modelling and analysis. • Provided necessary support with data for other task required for performance by the Study Team. • Analyse of all the surveyed data. • Assist the survey data collection and study team for the preparation of different reports;	

Sl. No.	Name of the Area of Consultant	No of Posts	Educational Qualifications	Experiences	Responsibilities (Indicative)	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**
				flow velocity etc		
Total		**27**				