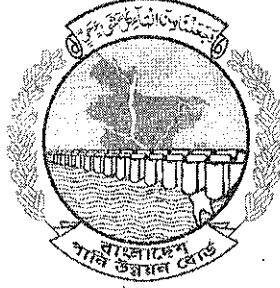


GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF WATER RESOURCES



BANGLADESH WATER DEVELOPMENT BOARD

Terms of Reference (ToR)

for

**Feasibility Study for Integrated River, Flood and Water Management in
Lakshmipur, Noakhali and Cumilla (Part) Districts**

(লক্ষ্মীপুর, নোয়াখালী ও কুমিল্লা (আংশিক) জেলার সমন্বিত নদী, বন্যা ও পানি ব্যবস্থাপনার নিমিত্ত
সম্ভাব্যতা সমীক্ষা)

September 2026



Table of Contents

1.	Background.....	1
2.	Study Area	1
3.	Objectives	2
4.	Scope of the Works.....	3
5.	Expected Output and Outcome.....	8
6.	Duration of the Services and Reporting.....	10
7.	Dissemination of Study Results.....	11
8.	Seminar/Conference/Workshop.....	11
9.	Personnel and qualifications	11
10.	Study Organization, Duties and Responsibilities	20
10.1.	BWDB's Responsibilities	20
10.2.	Consultant's Responsibilities.....	21
11.	Payment Schedule.....	22

B

9

✓

2

3

1. Background

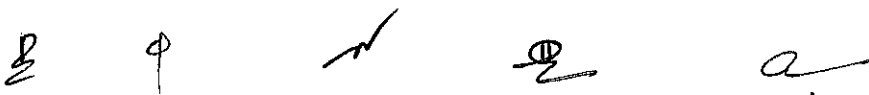
Lakshmipur, Noakhali and Cumilla are located in the south-eastern part of Bangladesh. The major rivers flowing over this part are river systems. In dry months, the many of the outfalls of these rivers get sedimented Dakatia, Gumti, Little Feni, old Dakatia, Bhulua, Rahamatkhali and Meghna (Lower) rivers. The water of these rivers is generally drained through Little Feni, Gumti, Dakatia, Rahamatkhali severely. During the monsoon season, increased upstream flow partially washes away previously deposited sediment and transports it to the sea. However, the net result is sedimentation in the outfall channels such as, Rahamatkhali river, Bhulua river and WAPDA Khal, reduces drainage capacity and enhance seasonal inundation in central depression area of Noakhali, Lakshmipur and Cumilla. The sediment deposition at outfall of the Noakhali Khal introduced an adverse drainage slope towards the outfall. Finally, the outfall of the Noakhali Khal was closed through construction of a closure just before the outfall, and the flow had been diverted towards the Bamni River through the Algir Khal.

Moreover, the Gumti River originated in the Indian state of Tripura and flows into Bangladesh, passing through Barura, Brahmanpara, Burichong, Adarsha Sadar, Sadar South, Debidwar, Laksam, Lalmai upazila of Cumilla district before draining into the Meghna River system affects Noakhali and Lakshmipur downstream. India has constructed various hydraulic infrastructures on the upstream section of the Gumti River, such as dams (e.g., Dambur Dam), regulators, and embankments. During heavy rainfall or monsoon seasons, water is released from these upstream dams and reservoirs. This sudden release causes a sharp rise in water levels in the downstream Gumti River, overwhelming its capacity within Bangladesh.

Such conditions result increased risk of flooding in Noakhali, Lakshmipur and Cumilla area. Local people experiencing the long-standing drainage congestion during the massive flood in August, 2024 which caused huge damage to lives, properties, and communication systems leads to the demand for an immediate measure to mitigate the problems. During the monsoon in 2024, the study area, being directly downstream, experiences riverbank overflows from the heavy rainwater carried through Gumti and Dakatia rivers and caused flooding. The flat terrain and poor drainage in these districts make them highly vulnerable to prolonged waterlogging and flash floods. The proposed study is to formulate an infrastructure plan considering recent flood of 2024. The water of the rivers and water bodies of Lakshmipur, Noakhali and Cumilla districts flows into the basin of the project area under discussion and from the said basin water enters the mentioned districts. In this context, Lakshmipur, Noakhali and Cumilla districts have been included in the study area. Bangladesh Water Development Board has taken initiatives to address this immense risk of degradation and sufferings of local people. Accordingly, this PFS has been prepared to carry out a detailed hydro-morphological investigation in Lakshmipur, Noakhali and Cumilla districts.

2. Study Area

The study area will cover the basins of Gomti, Bhulua & Rahamatkhali rivers in Lakshmipur, Noakhali and Cumilla districts. It will also include the tributaries, distributaries and interlinking khals in these three districts. *Figure 1* illustrates the proposed study area.





3. Objectives

The overall objective of the study is to conduct a detailed feasibility study to formulate plans for undertaking development projects of the study area focusing on integrated flood, water and river management, drainage improvement, urban flood management, and irrigation development for the improvement of socio-economic and overall environmental condition.

The specific objectives of the study are as follows:

- Development of a comprehensive, holistic and integrated plan combining nature-based long-term solutions for the flood-drainage-sedimentation problem of the study area basin, maintaining the environmental flow requirement of all rivers, analyzing water availability and sectoral demands, and considering the development initiatives of other sectors, future land use pattern, climate change and sea level rise;
- Preparation of the required short-term, mid-term and long-term intervention plan in a holistic approach including rivers and its tributaries/ distributaries/ khals;
- Identification of drainage problems and development of sustainable solutions in the study area as well as urban areas;
- Preparation of detailed design of proposed interventions along with required resettlement action plan, dredging alignment, volume and dredged material management plan;
- Detailed Environmental, Social Impact Assessment (ESIA) and Disaster Impact Assessment (DIA) in the study area in a comprehensive way;
- Detailed cost estimate of the projects including economic and financial analysis to acquire the extended project outcomes.

4. Scope of the Works

The proposed study is expected to address the water management issues in the study area river basin. The activities and the scope of work for the assignment are as follows (but not limited to):

A. Literature Review, Data Collection, Survey and Analysis:

- Review of previous study reports including the study titled as "Feasibility Study for Rehabilitation of Muhuri-Kahua Flood Control, Drainage and Irrigation Project in Feni District" and "Study for Investigation of Integrated Flood and River Management and Drainage Improvement Measures in Little Feni and Bamni River Basin";
- Impact assessment of existing and completed development projects categorically and identification of prevailing problems (i.e., bank erosion, breaching in embankment, salinity intrusion, outfall channel sedimentation, flood, drainage condition, navigability, irrigation facilities etc. from water resources management perspectives) and underlying causes within the basin of the study area including rivers, its tributaries/ distributaries/ khals;
- Collect and review of existing data, satellite images, maps, information and relevant available study reports;
- Detailed mapping of river and its tributaries, distributaries and linkage canal, khal, national, regional and local road network, railway network, embankment etc.;
- Develop a data collection plan to conduct the study;
- Collection of all necessary secondary data such as bathymetry data, historical water level, discharge, satellite imageries and etc.;



- Carry out bathymetric survey, topographic survey, measurement of water level, discharge, sediment concentration and all relevant data in the presence of consultant;
- Analyze the drainage congestion, flooding extent and dynamic erosion mechanism in details and demarcate the erosion prone areas along the bank of the study area river system;
- Preparation of an inventory of hydraulic structures with present condition and also analysis the impact of that structures to drainage, flood etc.;
- Analysis of bathymetric data and satellite images;
- Preparation of flow distribution map, river conveyance map, flood plain identification, and danger level fixation;
- Capture comprehensive drone video and prepare processed video of the survey area highlighting all rivers, network canals, and other issues;
- Collection of data regarding asset loss during previous flood events and formulation of sustainable solution for this;

B. *Assessment of Hydro-Morphologic Characteristics and Model Development:*

- Development of comprehensive solutions for flood, water and river management and checking sustainability of the solutions based on indicators and build back better approach;
- Assessment of hydrological and morphological condition, fixing the boundary condition for model development and develop hydrological and morphological model including analysis of detailed floodplain flow characteristics (using 2D overland flow model) in the study area for different design hydrological events for both without and with project conditions;
- Integration of the mathematical models developed for the Muhuri-Kahua and Little Feni & Bamni River Basin studies into the mathematical models of the present study to assess the impacts of proposed interventions of the recently completed studies and the interventions currently under implementation;
- Calibration and validation of the developed mathematical models using time-series data and establishment of measurable model performance criteria such as NSE, RMSE, MAE etc.
- Simulation of the 2024 flood conditions using the developed mathematical models to assess the inter-basin overland flow and its impacts in the study area;
- Simulation of hydrological and hydraulic model to optimize proposed structures and re-excavation/dredging of rivers/khals;
- Determination of the slope profile, average scour depth, average shear velocity, and bed shear at several locations to help in decision making;
- Assessment of the need and effectiveness of dredging on morphological processes;
- Assessment of climate change and sea level rise (SLR) impacts on the selected option;
- Assessment of present and projected water demand for domestic, agricultural, industrial, ecological, and other competing uses within the study area;

- Analysis of water availability considering seasonal variability, river discharge, groundwater interaction, climatic conditions, and existing upstream/downstream water abstractions;
- Assessment and determination of environmental flow (e-flow) requirements of the study area to ensure sustainable river/ecosystem health;
- Assessment of the impact of the hydraulic structures situated at the upstream of Gumti river in India on flooding in the study area;
- Assessment of adequacy of the drainage system as well as the drainage facilities and infrastructures implemented by different organizations;
- Assessment of the suitability of utilizing rainwater for irrigation through its conservation in the Bhulua and other rivers, canals, and water bodies etc.;
- Assessment of the feasibility of conserving water in canals/khals of study area and prepare list of potential khals to conserve water along with plan during dry season;
- Determine erosion vulnerable areas through analytical approach e.g. field investigation, image analysis, cross section analysis and planform analysis of river bank protection measures for saving government and private establishments;
- Flood risk mapping and pollution mapping;

C. *Development of Investment Plan and Design of Infrastructure:*

- Analysis of the prevailing problems and underlying causes within the basin of the study area, including rivers and their tributaries/ distributaries/ khals, considering existing projects;
- Development and application of appropriate methodologies for e-flow determination;
- Comprehensive water use analysis to evaluate current patterns of water extraction, consumption, efficiency, and allocation across different sectors;
- Preparation of a sustainable water use plan integrating environmental flow requirements with socio-economic and sectoral water needs;
- Formulation of a dry-season agricultural water use plan to optimize irrigation practices, improve water-use efficiency, and maintain minimum environmental flow requirements during low-flow periods;
- Sustainable planning and design of flood and river management measures including navigation for each river separately and also in an integrated way for short, medium- and long-term investment plan;
- Review of the design of the existing interventions and recommend improving the existing design system;
- Identify existing navigation facilities and study potential of improving navigation through creating interconnecting links between the rivers/khals and its maintenance plan;
- Fixing the dredging alignment, design and estimating the volume of capital and maintenance dredging as per SA/CS/RS/BS map if needed;
- Fixing the dredging alignment, design and estimating the volume of capital and maintenance dredging if needed;

- Preparation of dredged material management plan ensuring beneficiary use of the dredged material and following existing government policies or guidelines;
- Propose cost effective, environment friendly, sustainable and innovative design;
- Submission of detailed working design & drawing with design considerations, design reports & construction sequence (showing in figure) of all the proposed interventions. The prepared designs and drawings should be duly vetted by concerned Design circle of BWDB;
- Development of sustainable solution for drainage problems in urban areas of Lakshmipur, Noakhali, Cumilla and Feni districts;
- Development of an integrated plan for flood, water, and river management of the Gumti River with detail design;
- Analyzing of the necessity of rehabilitation of existing hydraulic structures, assessment of the necessity of dredging and loop-cut measures in the Gumti river based on the river's hydraulic and environmental conditions for efficient flood and river basin management;
- Incorporating the Delta Appraisal Framework (DAF) to align with the goals of BDP 2100 and principles of Adaptive Delta Management (ADM);
- Introduction of Integrated Water Resource Management (IWRM) based on availability of surface water;
- Proposed recommendation for pollution reduction of rivers, canals and water bodies;
- Classify the project area into high, medium, and low risk zones, based on survey data, mathematical modelling, and historical data analysis;
- Develop three alternative plans (Plan A, Plan B, and Plan C) and detailed design for each plan, enabling selection of a suitable plan based on financial capacity and acceptable risk levels;
- Prepare a phased implementation option where the overall project cost is particularly high;
- Carry out any additional analysis, documentation, and corresponding design revisions required in line with the Ministry's DPP review and the Planning Commission's PEC meeting recommendations.
- Preparing a documentary video (incorporating drone-based aerial videography) showcasing the vulnerable locations, rivers, canal networks of the study area;

D. *Assessment with respect to Environmental Sustainability, Climate Resilience, and Disaster Risk Analysis:*

- Assessment of the project with respect to Environmental Sustainability, Climate Resilience and Disaster Risk and find the ways for reducing/mitigating negative impacts;
- Assessment of environmental, disasters and climate change impacts or risk from the projects;
- Disaster Impact Assessment (DIA);
- Planning the counter measures to reduce/mitigate these negative impacts;

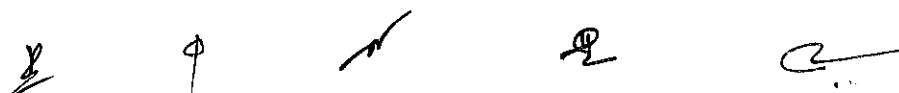
- Determination of costs for reducing/mitigating the negative impacts;
- Finding alternative ways of the project deliverables without incurring these environmental costs;
- Selecting contingency plan for emergency disaster management;
- Determination of the rehabilitation period after, remaining risks and adequate risk reduction measures;

E. *Environmental and Social Impact Assessment:*

- Establishment of physical, environmental and social baseline condition;
- Selection of valued environmental and social components impacted by the existing and proposed interventions in the project area;
- Collect socio-economic, Agricultural, Fishery and Environmental data and information through questionnaire survey, KII, FGD, field measurement and conduction of meeting with local stakeholders in person etc.;
- Identification of important ecosystem (land/aquatic) and measures for conservation/restoring of the ecosystem of the study area;
- Social Impact Assessment (SIA) study due to implementation of the project interventions;
- Assessment of future development of agriculture, fisheries, navigation, urbanization etc.;
- Assessment of land acquisition for establishing/restoration of rivers and preparing LAP & RAP;
- Formulation of options for the development of fisheries production capacity;
- Environmental Impact Assessment (EIA) study of the proposed interventions;
- Environmental Management & Monitoring Plan;
- Preparation of environmental enhancement and conservation plan;
- Preparation of bio-diversity conservation plan;
- Collection of ESIA Clearance Certificate from DoE;
- Dissemination of the study results to all stakeholders by arranging workshops;
- Preparation of ESIA study reports;
- Using the DAF tool to assess potential environmental and socio- economic impacts under present and future climate change and socio-economic uncertainties including demographic changes;
- Presentation of the recommendations formulated based on the study at the District Coordination meetings and, as needed, at the District Water Management Committee;

F. *Land Acquisition Requirement Assessment:*

- Collection of Mouza Maps (CS/SA/Diyara/BS map and Khatian);
- Assessment of land acquisition requirement and its amount;



- Reviewing land acquisition procedure and analysis alternative options to minimize amount of land to be acquired;
- Reviewing resettlement and compensation related act, rules and estimating the cost;
- Mouza wise assessment of total land acquisition based on CS/SA/Diyara/BS map and Khatian as per their classes;
- Carry out detailed digital topographical survey to find out the total number of shops, markets, tin-shed/pucca/semi-pucca houses, mosques, temples, graveyards, crematoriums, schools, madrasahs etc. which will be affected by this proposed project;
- Assessment of total costing of land acquisition with all kinds of compensation;
- Preparation of Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP);
- Preparation of legal and administrative framework for land acquisition;

G. *Economic and Financial Analysis*

- Preparation of detailed cost estimate on the basis of recent actual schedule of rates in the short, medium and long-term investment plan;
- Estimation of benefits to be derived and contribution to national GDP after implementation of the proposed project;
- Estimation of potential benefitted area, beneficiaries and new job opportunities to be created during and after the implementation of the proposed interventions;
- Estimation of BCR, EIRR, NPV of each planning option based on the with and without project situation;
- Detailed financial and economic analysis;

H. *Workshops and Reports*

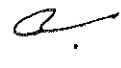
- Workshop and consultation meetings for disseminating the study results to relevant stakeholders;
- Preparation of Inception Report, Interim, Draft Final and Final feasibility study report according planning commission format compiling the technical, social, environmental and economic aspects;
- Preparation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

5. Expected Output and Outcome

Output:

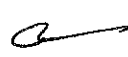
The expected outputs of the proposed Feasibility Study are as follows:

- A comprehensive database of all collected and surveyed study data including a geo-referenced base map of the study area;
- Inventory of existing rivers, khals, and water structures with status and rehabilitation recommendations;
- Flow Distribution, River Conveyance, Flood Risk and Pollution Map;

- A risk-based zoning map classifying the project area into high-, medium-, and low-risk zones
- Model reports based on calibrated and validated Model results of the project along with the simulation results of base condition and various options;
- A comprehensive, sustainable and integrated plan for water, flood, drainage, and sedimentation management;
- Comprehensive Management plan for all rivers in the study area, its tributary, distributary, inter-connecting khals and an integrated basin management plan;
- Sustainable solution for drainage problems in urban areas of Lakshmipur, Noakhali, Cumilla and Feni districts;
- Assessment reports on e-flow methodology framework, water availability, water demand, water use, dry-season agricultural water management plan etc.
- List of potential khals to conserve water along with plan during dry season;
- Three alternative intervention plans (Plan A, Plan B, and Plan C) and detailed design for each plan;
- Detailed working design & drawing with design considerations, design reports & construction sequence of all the proposed interventions;
- Detailed working design, alignment and quantity of dredging/re-excavation of rivers/khals and dredged material management plan;
- Detailed cost of the project including a phased implementation option and economic and financial analysis;
- B/C ratio, EIRR, Cost Estimates of the proposed interventions;
- Land acquisition plan (LAP) and resettlement action plan (RAP);
- 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
- A documentary video (incorporating drone-based aerial videography) showcasing the vulnerable locations, rivers, canal networks of the study area;
- Feasibility Study report of the overall development plan (Prescribed Feasibility study report format of Planning Commission);
- Any other, as deemed to be necessary, in compliance with the Scope of Works.

[All recommendations shall be specific, practical, evidence-based, and clearly presented, with adequate technical justification, implementation priorities, costs, and timelines, as applicable.]

Outcome:

Comprehensive management plan to mitigate flood and drainage problem along with sustainable water usages ensuring environmental flow of river resulting in enhanced food security, reduced water-related disasters, increased agricultural productivity through the development of optimal irrigation facilities and sustainable socio-economic growth of study area.

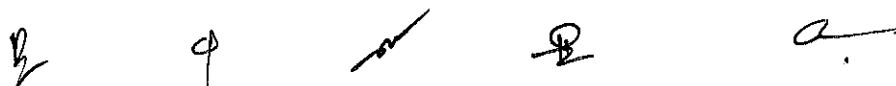
6. Duration of the Services and Reporting

The anticipated duration of the study is **24 months**. The schedules of submission of deliverables are as follows:

Sl. No	Report	Deadline
1	Inception Report (20 copies) <i>(Field Report must be included in the Inception Report)</i>	At the end of 2 nd month from the date of the contract.
2	Progress Report-1 (10 copies)	At the end of 5 th month from the date of the contract.
3	Progress Report-2 (10 copies)	At the end of 8 th month from the date of the contract.
4	Interim Report (20 copies)	At the end of 11 th month from the date of the contract.
5	Progress Report-3 (10 copies)	At the end of 14 th month from the date of the contract.
6	Progress Report-4 (10 copies)	At the end of 17 th month from the date of the contract.
7	Draft Final Report (20 copies) <i>(Along with detailed design vetted from concerned BWDB Design office and ESIA report in separate volume)</i>	At the end of 20 th month from the date of the contract.
8	Final Report (20 copies) <i>(Incorporating all comments and suggestions received from different concerned offices and including ESIA reports and Approved detail design.)</i>	At the end of 23 th month from the date of the contract.

N.B. Hard and Soft copies (in a portable Hard Drive) of all the reports, presentations, data, cross-sections, long profile, documents, kml file, shape file, model setup etc. have to be submitted to BWDB. Data and reports will be copyright property of BWDB. No part of this report may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods without the prior written permission of BWDB.

The office of the Project Director (PD) of BWDB would be representing BWDB and receiving all the deliverables mentioned above. Review meetings with participation of concerned Planning, Design and Field level officials of BWDB would be held on Inception, Interim, Draft Final and Final Reports. The office of the PD would communicate with other line departments and all concerned for consultation, sharing of ideas and to discuss the findings as well as disputes.



7. Dissemination of Study Results

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

8. Seminar/Conference/Workshop

A regional workshop is to be arranged by the consultant within the study period at the project area after the submission of Draft Final Report (DFR). The goal of arranging the workshop is to disseminate the study results among stakeholders, different government and non-government officials working in water and social sector, local administration, intellectuals etc. The PD office of this project shall provide necessary support to arrange the workshop.

9. Personnel and qualifications

a) Personnel

It is estimated that to carry out the study requires **21 Professional** of **101 Man-Months**. The composition of the team and their man-months is given below:

Sl. No.	Professionals	No. of Persons	Month	Quantity (Man-Month)
1	Team Leader/ Sr. Planning Engineer	1	8	8
2	Flood Management cum Drainage Engineer	1	6	6
3	Urban Drainage Modeler	1	6	6
4	Hydrological and Hydraulic Modeler	1	6	6
5	Morphological Modeler	1	6	6
6	Salinity and Storm Surge Modeler	1	6	6
7	Sr. Design Engineer (Civil)	1	7	7
8	Climate Change and Disaster Risk Management Specialist	1	5	5
9	Environmentalist	1	3	3
10	Survey Specialist	1	6	6
11	Sociologist	1	5	5
12	Agriculture specialist	1	3	3
13	Fishery Specialist	1	3	3
14	Economist	1	3	3
15	Ecologist	1	3	3
16	Jr. Design Engineer (Civil)	2	3	6
17	GIS Specialist	1	4	4
18	Junior Engineer	3	5	15
Total Professional		21		101

b) **Qualification, Experience and Task of Personnel:**

Discipline	Qualification, Experience and Task
1. Team Leader/ Sr. Planning Engineer	<p>He/she shall have Bachelor degree in the field of Civil Engineering/ Water Resources Engineering or equivalent subject. S/he should have 20 years of professional experiences and 15 years of specific experience in planning of water resources project. Leading and managing a study team for flood control, drainage and irrigation projects. Higher degree in relevant field is preferred.</p> <p>His/ her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Guide and supervise all project activities; • Review of past studies. • Review of the river systems of the study area; • Formulate strategy and action plan for the study; • Preparation of water and flood management plan for the study area; • Formulate land acquisition plan, dredging alignment and dredged material management plan; • Guide, supervise, monitor and review the progress of the overall activities of the study; • Understand the overall water management aspect in the project area; • Identify water management related problems with due attention to flood, drainage, irrigation, bank erosion etc. in the area • Formulate options for addressing the identified problems and issues with emphasis on integrated water management; • Evaluate effectiveness of different options; • Classify the project area into high, medium, and low risk zones, based on survey data, mathematical modelling, and historical data analysis; • Develop three alternative plans (Plan A, Plan B, and Plan C) for each project proposal, enabling selection of a suitable plan based on financial capacity and acceptable risk levels; • Prepare a phased implementation option where the overall project cost is particularly high; • Carry out any additional analysis, documentation, and corresponding design revisions required in line with the Ministry's DPP review and the Planning Commission's PEC meeting recommendations; • Maintain liaison with BWDB and related agencies; • Coordinate all the components and team members of the study; • Attending meeting as and when required; • Guide preparation of different reports as per requirement of the study; • Miscellaneous task as and when required.
2. Flood Management cum Drainage Engineer	<p>S/he should have Bachelor degree in Civil Engineering/ Water Resources Engineering/ River Engineering/ Hydraulic Engineering/ Hydrology or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience in Flood Management and drainage management, hydrology and water</p>

Discipline	Qualification, Experience and Task
	<p>resource management. Higher degree in relevant field is preferred. His/her major responsibilities shall include but not necessarily be limited to:</p> <ul style="list-style-type: none"> • Carry out reconnaissance field visit and interaction with BWDB officials, local stakeholders, government/ non-government offices of different disciplines, societies, etc. • Estimate previous flood asset loss and sustainable solution for this; • Develop baseline condition of hydrological features of the study area with emphasis on flood management and drainage; • Analyze drainage congestion, flood extent and hydrological characteristics of study area using historical data and hydrodynamic model results; • Understand flood management and drainage practice in the project area; • Plan potential of future Flood Management and drainage management/ development in the area • Propose suitable structures or activities for extension of irrigation in the area based on available resources; • Assist in report writing and presentation; • Assist team leader and other members as and when required; • Attend in meeting, workshops, etc. organized under the study.
3. Urban Drainage Modeler	<p>S/he should have Bachelor degree in Civil Engineering/ Water Resources Engineering/River Engineering or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience in hydrological data analysis, hydrological-hydraulic modelling for the riverine and urban environment, drainage management, hydrology and water resource management. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to:</p> <ul style="list-style-type: none"> • Reviewing existing drainage network and major water bodies in the study area; • Developing baseline condition of hydrological features of the study area; • Development of hydrological characteristics of study area using historical data and hydrodynamic model results; • Review and update hydrodynamic model for the study area; • Development of several options for flood control and drainage improvement; • Assist in identification of suitable biological treatment options; • Assist in water quality assessment of the study area; • Assist in optimization of different parameters of the biological treatment; • Assist in report writing and presentation; • Assist team leader and other members as and when required; • Attend in meeting, workshops, etc. organized under the study.
4. Hydrological cum Hydraulic Modeler	<p>S/he should have Bachelor degree in Civil/Water Resources Engineering or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience in</p>

Discipline	Qualification, Experience and Task
	<p>hydrological data analysis, hydrological and hydraulic modelling for flood and drainage management. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to:</p> <ul style="list-style-type: none"> • Carry out field visit and understand the hydrology and river system of the study area. • In association with other members of the study team prepare data collection plan for the study. • Guide data analyst to check, process and analysis of hydro-meteorological and topographic data made available under the study. • Develop, calibrate and validate rainfall-runoff models of the project area. • Develop, calibrate and validate hydrodynamic model of the study area. • Simulate models for different options/scenarios and hydrological event. • Prepare flood inundation maps under different extreme hydrological events. • Assessment of the environmental flow of the rivers in the study area; • Determination of e-flow methodology framework, water availability, water demand in the area; • Preparation of water use analysis report, integrated sustainable water use plan, dry-season agricultural water management plan; • 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.
5. Morphological Modeler	<p>S/he should have Bachelor degree in Civil Engineering/Water Resources Engineering or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience in hydraulics and coastal morphology with comprehensive intellectual and professional knowledge and skill. Experience in the tidal river/coastal zone morphology is preferable. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Identify the present morphological process in tidal environment and erosion-deposition pattern of the project area • Develop morphological/sediment transport/mud transport model • Establish baseline morphological behavior based on model result and available data • Develop and simulate different scenarios; • Prepare erosion/deposition maps, flow distribution maps and river conveyance maps;

Discipline	Qualification, Experience and Task
	<ul style="list-style-type: none"> • Assess the bank line shifting and danger level fixation; • Contribute in preparing the report of the study and workshop materials; • Attend meeting as and when required.
6. Salinity and Storm Surge Modeler	<p>S/he should have Bachelor Degree in Civil Engineering/ Water resource Engineering/ Coastal Engineering or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience in the field of river hydraulics and numerical modelling specially in cyclone/storm surge modelling and salinity modelling. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Review of available data and reports; • Analyze the salinity and cyclone data; • Develop storm surge and salinity models. • Interpret model results in accordance with the requirement of BWDB. • Assessment of storm surge level for different return period around the proposed area; • Assessment of embankment crest level for fifty/hundred-year return period considering storm surge level and cyclonic wave; • Preparation of Disaster Impact Assessment (DIA) for storm surge; • Contribute to report writing.
7. Sr. Design Engineer (Civil)	<p>S/he should have Bachelor degree in Civil Engineering/ Water Resources Engineering or equivalent subject. S/he should have 12 years of professional experience including 8 years of experience in planning and design of hydraulic structures. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Review existing hydraulic structures in the study area; • Suggest data collection plan to carry out detail design of structures; • Suggest suitable structures to carry out planning of proposed project; • Supervise the preparation of detail working design of recommended interventions; • Revisit the existing design and design the rehabilitation of infrastructure for improvement of functionality; • Carry out any additional analysis, documentation, and corresponding design revisions required in line with the Ministry's DPP review and the Planning Commission's PEC meeting recommendations; • Assist team leader as and when required; • Attend in meetings and workshop as and when required; • Any other work that may be necessary for successful planning.
8. Climate Change and Disaster Risk	<p>S/he should have Bachelor degree in Civil Engineering/Water Resources Engineering/Hydrology or equivalent subject; or Master's degree in Disaster Science and Climate Resilience/ Environmental</p>

Discipline	Qualification, Experience and Task
Management specialist	<p>Science and Sustainability/ Climate Change and Development/ Disaster Risk Management or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience in assessment of climate change and disaster risks management in water sector. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Review and analyze relevant policies and related documents regarding climate change, disaster risk reduction and other related developments dynamics especially which will impact on delivery of the projects; • Assessing water related climate risks in the water resources management systems; • Creating enabling environment for climate risk-informed integrated water resources management and development; • Contribute to risk managements of the project by close monitoring and provide technical advice to mitigate the risks and/or inform corrective actions; • Preparation of Disaster Impact Assessment (DIA) and section of contingency plan; • Contribute in preparing the report of the study and presentation materials; • Attend meetings with the client, contractor and other stakeholders as and when required; • Assist Team Leader and keep updating regarding activities and related issues with climate change and sea intrusion in the project area.
9. Environmentalist	<p>S/he should have Bachelor degree in Civil Engineering/Water Resource Engineering/ Environmental Engineering; or Master's degree in Environmental Management/ Environmental Science/ Disaster Management/ Geography and Environment/ Environmental Economics or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience including preparing ESIA, IEE, EMP. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • 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; • Prepare environmental data collection plan and guide team leader to collect them; • 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;

Discipline	Qualification, Experience and Task
	<ul style="list-style-type: none"> • 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.
10. Survey Specialist	<p>S/he should have Bachelor's Degree in Civil Engineering/Water Resources Engineering/ Coastal and River Engineering/ Oceanography or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience in supervision of topographic survey, river bathymetry, hydrological data collection, etc. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Assist Team Leader in planning the hydrographic survey and hydrometric data collection; • Quality control of all hydrographic surveys, data collection & processing, quantification of dredging volume; • Quality control of any other survey (water level, water flow, sediment concentration, land level survey, bank survey and so on) and data processing; • Planning, supervise and conduct hydrographic surveys and land level surveys required for the detailed design of bank protection works, water control structures etc. • Assist Team Leader to finalize survey reports; • Miscellaneous related task as and when required; • Attend meetings with the client, contractor and other; • Consult stakeholders as and when required.
11. Sociologist	<p>S/he should have Master's degree in Social/ Political Science or equivalent subject with relevant experience of social considerations. S/he should have 12 years of professional experience and 8 years of specific experience in relation to implementation of development projects. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to:</p> <ul style="list-style-type: none"> • Field visit and understand the socio-economy of the study area; • Design socio-economic survey tools and methodology; • Conduct focus group discussions (FGD), public consultation and Key Informant Interview (KII) for collecting primary data on social condition, cultural values, etc.; • Analyzing and interpreting the data on CS/RS map; • Formulate a Land Acquisition Plan (LAP)/Resettlement action plan (RAP) for project components; • Collect and analyze social baseline data; • Assess social impacts, suggest mitigation measures due to the proposed project; • Contribute in preparing the ESIA/SIA report of the study; • Attend in the meetings, workshops as and when required; • Assist Team Leader/ Sr. Planning Engineer as and when required.

Discipline	Qualification, Experience and Task
12. Agriculture Specialist	<p>S/he should have M. Sc. degree in Agriculture or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience with experience in field survey, evaluation of agricultural benefits of a project between pre & post project condition by introducing improved agricultural practices. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Field visit and understand the study area; • Analysis of the existing conditions of the agricultural practices and production; • Suggest improved agricultural method with respect to time, land, cropping pattern, cropping inputs & agricultural practices; • Evaluate the agricultural benefits after post project condition; • Help design crop calendar, cropping pattern and irrigation water use; • Assess the agricultural benefit derived from the project interventions; • Contribute in the ESIA and other relevant report preparation; • Attend in the meetings, workshops as and when required; • Assist Team Leader/ Sr. Planning Engineer as and when required.
13. Fishery Specialist	<p>S/he should have M.Sc. degree in Fisheries or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience in fisheries sector projects. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Field visit to understand the project area. • Establish baseline situation on existing fishing activities and resources. • Conduct field survey to collect data on fishery aspect. • Evaluate potential and threat in fishery resources. • Formulate future fishery development plan in the project area. • Carry impact study and suggest mitigation measures due to proposed project. • Assess the Fishery benefit derived from the project interventions. • Contribute in the ESIA and other relevant report preparation. • Attend in the meetings, workshops as and when required. • Assist team leader and planning engineer as and when required.
14. Economist	<p>S/he should have Master's Degree in Economics/Social Science/ Environmental Economics/Agri-Economics or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific experience in economic analyses of water development projects. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to:</p> <ul style="list-style-type: none"> • Assess economic impacts and suggest mitigation and enhancement measures due to the proposed project. • Elaboration of the feasibility level cost estimates, contingency

Discipline	Qualification, Experience and Task
	<p>amounts, detailed price escalation etc.</p> <ul style="list-style-type: none"> • Estimate BCR, EIRR, NPV, sensitivity analysis and other economic parameters of project assessment. • Assessment of socio-economic viability of the project as a whole. • Prepare annual expenditure schedule. • Assist in preparing cost estimate following the DPP format. • Assist in developing three alternative plans (Plan A, Plan B, and Plan C) for each project proposal, enabling selection of a suitable plan based on financial capacity and acceptable risk levels; • Assist in preparing a phased implementation option where the overall project cost is particularly high; • Contribute in report writing. • Attend meetings, workshops as and when required. • Assist Team Leader/ Sr. Planning Engineer as and when required.
15. Ecologist	<p>S/he should have M. Sc. in Ecology or equivalent subject. S/he should have 12 years of professional experience and 8 years of specific 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. Higher degree in relevant field is preferred.</p> <p>His/her major tasks include but not limited to the following:</p> <ul style="list-style-type: none"> • Scope and identify of zones of importance for terrestrial ecosystem functions of key species such as areas of feeding, breeding, calving, and spawning of these species. • Design and develop methodology along with collection, compilation and analysis of data related to biological resources in river and sea and terrestrial resources; • Establish baseline condition of terrestrial resources and aquatic resources; • Recommend measures to offset negative impacts and will assist team leader in interpretation of data as well as in preparing the ESIA report; • Responsible for preparing environment management plan, biodiversity conservation plan, mitigation measures and monitoring plan.
16. Jr. Design Engineer (Civil)	<p>S/he should have Bachelor's Degree in Civil Engineering/Water Resources Engineering or equivalent subject. S/he should have 3 years of professional experience and 1 years of specific experience in design of hydraulic structures. Design Engineer will be responsible for design of alternative structures/measures, calculation of the cost estimate and compare the alternatives. Previous experience in similar working environment will be preferred. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Design of recommended interventions; • Assist the senior Design Engineer for detailed design of proposed bank protective works, various water control structures, dredging section of river/khals etc.;

Discipline	Qualification, Experience and Task
	<ul style="list-style-type: none"> • Preparation of cost estimates of the interventions on the basis of recent actual schedule of rates; • Preparation of different reports as required for the proposed study; • Assist the Sr. Design Engineer as and when required. • Any other work that may be necessary for successful planning.
17. GIS Specialist	<p>S/he should have Bachelor degree in Civil Engineering/Water Resources Engineering Engineering/Urban and Rural Planning or Masters' degree in Geography. S/he should have 3 years of professional experience and 1 years of specific experience in producing GIS coverage, contour map, Digital Elevation Model. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Preparation of GIS based maps of project area, drainage network and road network. • Preparation of project map showing existing and proposed infrastructures. • Perform spatial data analysis required for the study. • Preparation of maps for workshops and reports. • Assist the study team in report writing. • Miscellaneous task as and when required.
18. Junior Engineer	<p>S/he should have Bachelor's degree in Civil Engineering/ Water Resources Engineering with 3 years of professional experience including experience in collection and analysis of data of topography, bathymetry, hydro-metric, water quality, soil sample, morphology. Higher degree in relevant field is preferred.</p> <p>His/her major responsibilities shall include but not necessarily be limited to the following:</p> <ul style="list-style-type: none"> • Responsible for the collection of relevant field data and data from different organizations; • Assist the Team Leader/ Sr. Planning Engineer in preparation of site plan of proposed structures. • 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 all the surveyed data; • Responsible for compiling and preparing the Inception, Interim, Draft Final and Final reports along with other documentation.

10. Study Organization, Duties and Responsibilities

10.1. BWDB's Responsibilities

The Consultant shall work under the direct supervision of the office of the Project Director (PD), BWDB, Dhaka. The Hydrology wing of BWDB shall assist the project team as required, particularly with regard to the hydrological and morphological aspects of the study. The PD would also ensure the involvement of concerned officials of BWDB in survey works, field data collection activities as and when required by the consultant. Field survey and field

data collection will be done by the consultant in close consultation with the concerned field Executive Engineers and design office of BWDB under the guidance of the concerned Superintending Engineers.

The PD of this project will ensure that the objective of the study as detailed in the ToR would be achieved within all agreed time schedule and that the contents of the report are acceptable to GoB and will direct the planning process and work program, supervise the study and monitor progress according to the objectives set in ToR. BWDB will only bear the cost of the items that were mentioned in the reimbursable cost. Other unspecified costs won't be borne by BWDB.

The PD of this project will arrange regular meetings between the consultant and BWDB professionals and concerned officials from other agencies to discuss technical and project management issues. Any unresolved issue either technical or otherwise shall be taken up with BWDB's senior engineers (Chief Engineer (Civil) Planning, concerned Chief Engineers, Chief Engineer (Civil) Monitoring, Chief Engineer Design and Chief Engineer (Civil) Hydrology or other GoB agencies as required).

BWDB shall provide or make available the following data, services and facilities to the consultants, as per existing rules of BWDB. However, BWDB shall not provide any office space for this consultancy service. Concerned Design office will supervise the design and drawing and guide the consultant.

- Available hydrological, morphological, meteorological data and records on rivers and khals of the Study Area following existing BWDB data acquisition rules;
- Available contour maps, aerial photographs, mosaics, maps and previous study reports of the Study Area, if required;
- Any other services, available with BWDB, to help the consultants to carry out the data collection and project evaluation program as per ToR;
- Necessary guidance on study activities when required;
- Any clarification required about this document for clear understanding of the process of conducting project evaluation.

10.2. Consultant's Responsibilities

The consultant should carry out the services as detailed in "Objectives, Scope of Works and Expected outputs" in the best interest of the Government with reasonable care, skill and diligence with sound engineering, administrative and financial practices. The Consultants should be responsible to the client (BWDB) for discharge of responsibilities. It will be the responsibility of the consultant to collect all related information and data required for conducting the study. The consultant shall maintain full and continuous liaison with the BWDB concerned project and field offices. Throughout the consultancy period, the consultant's activities will be reviewed time to time by BWDB conforming to the schedule of time. The consultant at every stage starting from planning of the study, developing methodology, conceptual solutions, river management plan, flood and drainage improvement measures, revision of plan, developing mathematical model etc. will meet with the expertise of BWDB to explain the issue and based on the discussion they will improve the measures. The consultant team will also take the opinions from the officials of relevant sectors through Technical Committee meeting. The study must be complied with Bangladesh Delta Plan 2100, Sustainable Development Goals (SDG), Bangladesh Water Act-2013, Bangladesh Water Rules-2018 and relevant acts, Rules, regulation, policies.



Reports prepared and submitted by the consultants shall be reviewed and approved in tripartite meeting. The consultant will strictly follow the objectives, scope of works, and outputs of the study. All the collected raw and processed data, reports and developed models with input data considerations are to be handed over to BWDB in GIS and any other format what so ever used in the study in soft copies. After completion of the study Printer and Computer accessories should be handed over to BWDB. The publication of the data and used in the study of third party require prior written permission of BWDB. In response to that, the consultant should-

- Make available all the primary and secondary data (entire set of information involving audio-visual recordings) to BWDB or other agencies concerned as and when required. Data and information would be submitted to the client both in hard and soft copies;
- Make necessary arrangements for site investigation, environmental and social survey & data collection as needed for performance of the assigned task and evaluation thereby;
- Provide all support for the effective delivery of the services as stipulated in the objectives, scope of works and expected outputs written in the ToR;
- Actively join the workshops with regard to the purpose of the study in presence of the BWDB officials and other stakeholders both at the project area;
- All types of technical support (like preparation of maps on necessity of the client and any other information related to the task the consultant is assigned with) to be provided to the client;
- Consultant will prepare design under the supervision and guidance of concerned design office.

All the stakeholder consultation sessions would be recorded for future documentation. Video recording would be done and the clips should be handed over to the client. Discussants would be introduced with necessary introductory information and mobile phone number duly incorporated in the reports. Discussion points should be focused properly and addressed accordingly.

11. Payment Schedule

Payments shall be made in line with agreed-on outputs according to the following schedule:

- **Inception Report:** Ten (10) percent of the lump-sum Contract Price shall be paid upon submission of the Inception Report duly accepted by the Client.
- **Progress Report-2:** Ten (10) percent of the lump-sum Contract Price shall be paid upon submission of the Progress Report-2 duly accepted by the Client.
- **Interim Report:** Twenty (20) percent of the lump-sum Contract Price shall be paid upon submission of the Interim Report duly accepted by the Client.
- **Progress Report-4:** Ten (10) percent of the lump-sum Contract Price shall be paid upon submission of the Progress Report-4 duly accepted by the Client.
- **Draft Final Report:** Thirty (20) percent of the lump-sum Contract Price shall be paid upon submission of the Draft Final Report duly accepted by the Client.
- **Final Report:** Thirty (30) percent of the lump-sum Contract Price shall be paid upon submission of the Final Report duly accepted by the Client.



The Specification and Estimate Committee which has been formulated as per memo no. 42.01.0000.000.035.99.0011.24.236, Date: 09 September 2026 has reviewed the ToR and recommended for kind approval of the competent authority. Thus, the ToR is hereby forwarded for kind approval.

Rakib 22.09.26
(M. Abdur Rakib)

Executive Engineer (Civil)
Directorate of Planning-1, BWDB, Dhaka
& Member, Specification and Estimate
Committee

MD. Khairul Islam 22.09.2026
(Dr. Md. Khairul Islam)

Superintending Engineer (Civil)
Directorate of Planning-1, BWDB, Dhaka
& Member-Secretary, Specification and
Estimate Committee

Hafizul Alam 22/09/2026
(Md. Hafizul Alam)

Superintending Engineer (Civil)
Contract & Procurement Cell, BWDB, Dhaka
& Member, Specification and Estimate
Committee

Md. Majadur Rahman 22.09.26
(Md. Majadur Rahman)

Superintending Engineer (Civil)
Design Circle-4, BWDB, Dhaka
& Member, Specification and Estimate
Committee

Rabin 22/09/26
(Dr. Robin Kumar Biswas)

Addl. Chief Engineer (Civil) Planning,
BWDB, Dhaka
& Convener, Specification and Estimate Committee

Approved.

P 13.10.24
(Md. Ruhul Amin)
ID No. 680207001
Director General
BWDB, Dhaka.

