

**Terms of Reference (ToR)**  
**For**  
**Consultancy Services for Construction Supervision & Detailed Engineering Design of 5 (five) Districts**  
**under B-STRONG Project (BWDB Part)**  
**(Contract Package No. BSTRONG/BWDB/S-06)**

**1. Background**

Flooding in Bangladesh is a recurring and devastating natural disaster that affects millions of people each year. Bangladesh is positioned on the floodplains of major rivers draining from the Himalayas with low-lying geography makes it susceptible to seasonal flooding. During the monsoon season (from early June to mid-October), the rivers that drain into the Bay of Bengal can become overwhelmed and winds from the sea heading towards land raise the water levels causing flooding locally or on a large-scale. On average, annual floods inundate 20.5 per cent area of the country and this can reach as high as about 70 per cent during an extreme flood event. These floods can submerge vast areas, displacing communities, destroying crops, and causing widespread damage to infrastructure. Climate impacts are already damaging ecosystems, livelihoods, infrastructure and food security. Despite ongoing efforts to improve flood management and response strategies, the country continues to face significant challenges, highlighting the need for support in building resilience and adapting to the increasing frequency of extreme weather events exacerbated by climate change.

Bangladesh experienced heavy rainfall in August 2024, resulting in significant flooding and severely impacting 11 eastern districts: Noakhali, Sylhet, Maulvibazar, Habiganj, Brahmanbaria, Comilla, Feni, Lakshmipur, Khagrachhari, Chattogram, and Cox's Bazar, with a return period estimated to be 50-100 years for floods of this magnitude. At several rainfall stations, a peak daily rainfall of 200 to 300 millimeters was observed with a total rainfall of 600 – 800 millimeters within a week. This amount of rainfall is more than 2.5 times higher than the average conditions and exceeded 1,000 millimeters in one month. The floods had a quick onset ('flash floods') behavior due to the catchment topography. The upstream part of the catchment where Feni, Noakhali and Comilla are located is hilly and its altitude is much higher. The catchments are small and short and result in quick runoff of rainfall in downstream direction. Heavy rainfall patterns, low-pressure systems influence, and regional rainfall in the upstream are among possible factors that devastate the rivers and drainage systems, which were not designed to handle such sudden and massive inflows. The country experienced a notable increase in average mean temperature, rising by 0.16°C per decade, with the eastern divisions experiencing the most pronounced changes during summer and fall months.

The recent flooding has caused catastrophic impacts across multiple sectors, significantly affecting millions of people, infrastructure, and the economy in the affected regions. The scale of the disaster has led to significant loss of life, widespread damage to infrastructure, and severe disruption to daily life and economic activities. The ongoing floods have affected over 5 million people and displaced over 500,000. Impacts from the disaster are widespread, large-scale, and multi-sectoral, affecting key sectors including agriculture, fisheries and livestock, housing, transport, electricity, other basic infrastructure, health, education. Access to affected areas is hindered by these submerged roads and power outages, leaving over 50% of Noakhali's impacted areas unreachable. At least 30 km of erosion has been reported by the Bangladesh Water Development Board (BWDB) in the five subject districts, including further deterioration of previously unstable banks. Furthermore, 87 Km embankments were damaged in the affected districts. The floods have also partially or fully damaged 370,000 hectares of cropland and 40,000 fish farms, impacting 1.4 million farmers and amounting to around US\$279 million of crop losses and US\$19 million in fisheries losses. 176,000 and

37,900 water points have been partially and fully damaged. 6,542 km of roads and 1,666 bridges/culverts and numerous canals have been primarily affected, exacerbating waterlogging conditions across impacted regions during the August 2024 flood.

Projected climate change under a 2°C warming scenario will substantially amplify flood risks across Bangladesh's major river systems, necessitating proactive infrastructure adaptation and resilience measures. Under a 2°C warming scenario, the magnitude of 1-in-100-year flow events is expected to increase significantly across major rivers (29% in the Ganges, 24% in the Brahmaputra, and 38% in the Meghna), potentially affecting an additional 6-12 million people by 2035-2044. Projections indicate that extreme precipitation temperature events will become more common which expected to lead to more frequent and severe floods, increasing the risk of riverbank erosion, damaging infrastructure mostly dams, embankments, bridge. To address these mounting challenges, infrastructure must be reconstructed with upgraded climate-resilient standards capable of withstanding extreme climate-related events. This comprehensive approach to infrastructure development necessitates systematic maintenance and rehabilitation, with facilities requiring regular upgrades to climate-resilient standards that can effectively withstand extreme weather events.

These districts are in urgent need for bank protection, hydraulic structure repair, riverbank protection, canal re-excavation to help them building resilient rehabilitation. Existing facilities and resources are strained beyond capacity. These infrastructures have been heavily damaged, impeding both relief operations and recovery efforts. So, the Government has decided to put emphasis on building or reconstructing infrastructure in the affected districts due to the climate induced flash flood.

## 2. B-STRONG Project

The floods have significantly impacted Bangladesh's capacity to respond to the disaster. Based on the IDA 20 CRW, this crisis meets the criteria for accessing CRW resources. The floods destroyed a large amount of the affected region's buildings, infrastructure, critical facilities, and other livelihoods assets such as cropland, agriculture equipment, and livestock and fish farms. The proposed project- **Bangladesh Sustainable Recovery, Emergency Preparedness and Response Project (B-STRONG)** is intended to address short-term immediate needs, medium-term recovery, and longer-term resilient reconstruction following a "Build Back Better" approach. The project will comprise component of people-centric resilient infrastructure (supporting resilient reconstruction of basic infrastructure damaged by the floods). This flood protection rehabilitation objective will be restored by the fluvial, pluvial, and flash floods protection standards through a combination of interventions including (i) embankment repair works, (ii) canal re-excavation works, (iii) hydraulic structure repair works, and (iv) river bank and slope protection works and implementation of Social Action and Environment Management Plans.

Repair of flood-damaged embankment in Feni, Noakhali, Brahmanbaria, and Comilla districts will be 72.55 km, number of hydraulic structures like drainage sluices/flushing sluices repair/rehabilitation will be 21 in Feni and Lakshmipur districts. Precautionary riverbank protection work/repair/strengthening damaged by flood in Feni, Noakhali, Lakshmipur and Comilla districts will be 37.3 km, 2.56 km slope protection work will be done in Comilla district. Furthermore, 19.6 km canal re-excavation work will be completed to increase drainage capacity in Comilla and Lakshmipur districts. The figures, volumes, numbers and lengths mentioned in the ToR are subject to change if studies under this assignment call for changes.

A part of proceeds from this credit would be used for **Consultancy Services for Detail Design, Construction Supervision and Project Management Support.**

The proposed area for the above-mentioned intervention is given in the table below-

**Table 1: Proposed Project Location and BWDB interventions list.**

| Interventions                             | Unit | Quantity in individual district |          |         |            |              | Total |
|-------------------------------------------|------|---------------------------------|----------|---------|------------|--------------|-------|
|                                           |      | Feni                            | Noakhali | Cumilla | Lakshmipur | Brahmanbaria |       |
| Permanent bank protection works           | km   | 3.13                            |          | 2.40    |            | 0.25         | 5.78  |
| Precautionary bank protection works       | km   | 10.14                           | 9.85     |         | 10.40      |              | 30.39 |
| Slope protection works                    | km   |                                 |          | 2.56    |            |              | 2.56  |
| Permanent bank and slope protection works | km   |                                 |          |         |            | 1.13         | 1.13  |
| Regulator repair                          | nos  | 20                              |          |         | 1          |              | 21    |
| Repair of Embankment                      | km   | 24.55                           |          | 46.00   |            | 2.00         | 72.55 |
| Khal re-excavation                        | km   |                                 |          | 7       | 12.6       |              | 19.60 |

### 3. Objective of Consulting Services

The main objectives of the consultancy services are to review and update (where needed) design details regarding bank, embankment protection works, canal re-excavation works etc. and also review social, environmental plans related to this project. Preparation of detailed design, conduct engineering surveys and bidding documents following Government and the World Bank procurement regulations for the proposed works in the respective districts including environmental and social studies like Social Management Framework (ESMF), Resettlement Policy Framework (RPF), Stakeholder Engagement Plan (SEP) and Labor Management Procedure (LMP), social mobilization of community group. Supervise and monitor construction of all works and finally provide overall project management support to the BWDB.

### 4. Scope of Works

Scope of the services include detailed design, construction supervision, preparation of bidding document following Government and the World Bank procurement regulations, environment and social documents and project management support to the flood protection embankment re-sectioning and repair works, flood control hydraulic structure reparation works, flood protection river bank protection works and canal re-excavation works. The detailed scope of the consultancy services tasks is described below-

**Task A.** Review feasibility study report, existing design documents of project interventions, related environmental and social framework documents (already prepared by BWDB) and project site investigation

**Task B.** Prepare detailed designs for embankment repair, canal re-excavation, hydraulic structure, riverbank protection works, the Engineering and Environment and Social studies (i.e., preparation of ESMF, SEP, LMP, RFP and RAPs) and other works as required.

**Task C.** Social mobilization of community groups including setting up Water Management Organization (WMO) through preparation and implementation of Social Action plan through engagement of local communities and community groups

**Task D.** Supervise construction of all works, co-ordination with PMU and contract management

**Task E.** Provide overall project management support to the BWDB and Project Management Unit (PMU) including continuation and further development of ICT monitoring system developed under CEIP-I.

The BWDB will execute physical works through national competitive bidding (NCB), with the BWDB Project Management Unit (PMU) serving as the Procuring Entity. BWDB will hire a detailed design, construction supervision and project management support (DDCS&PMS) consultancy firm to act as "Project Manager" for civil works and introducing ICT-based interventions for supervision oversight. The concerned Executive Engineers of respective O&M divisions will do carry out the field level coordination with the PMU and Project Manager. This approach is similar to earlier successfully completed World Bank financed projects such as ECRRP and CEIP-I. The Consultancy firm will administer the civil works contracts and ensure that the Project works are implemented in accordance with the provision of the contracts. Project Manager/ Team Leader has to take prior approval/ consent from Project Director before issuing any variation and additional work order.

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**Task A: Review Designs, E&S Documents and Site Investigation**

Task A covers initial information gathering of the project area which will include

- Review detailed design and engineering surveys of embankment re-sectioning, canal-excavation, and flood control hydraulic structure.
- Review non-structural interventions which includes related environmental and social plans (Social Management Framework (ESMF), Resettlement Policy Framework (RPF), Stakeholder Engagement Plan (SEP), and Labor Management Procedure (LMP)
- Feni, Noakhali, Comilla, Lakshmipur and Brahmanbaria districts site visit for understanding of the project area
- Initial assessment and mapping of the whole project area
- Update and carry out any additional engineering studies, investigations and social and environmental studies needed.

**Task B: Prepare Detailed Designs, bidding document and Environment and Social Studies**

This task will cover the preparation of detailed designs and documents for embankment repair works, canal re-excavation works, hydraulic structure reparation works, and riverbank protection works that are approved to be included in the Project. The design report would be prepared for each contract package consisting of engineering, environment and social with appropriate ESMF, SEP, LMP, RPF and RAPs. This task will also focus on modeling aspects of hydrology, hydrodynamics, morphodynamics, considering climate change projections as boundary condition, flood risk assessment, among others and engineering designs.

**Task B1: Preparation of detailed design for slope and bank protective works as well as other activities (as required):**

Detailed Design Preparation of Precautionary Riverbank Protection Work/Repair/Strengthening of RBPW and Slope Protection Works:

- Evaluate existing structures and protection works to assess functionality and integrity.
- Conduct the necessary topographical bathymetric, river and canal cross-section, hydrometric survey and site investigation using total station, Differential Global Positioning System (DGPS), high frequency eco-sounder, Acoustic Doppler Current Profiler (ADCP) and satellite imagery, Geographic Information System (GIS) and other computerized systems to gather data necessary for hydrological river engineering studies as mentioned above and for improving and calibrating available hydrodynamic models to test for various strategies and alignments and design for river embankment system to provide most optimal solution for improving its performance considering technical, economic, social and environmental aspects.
- Develop detailed designs for new riverbank protection works, including materials specification, engineering calculations, and construction methodologies.
- Create designs for slope protection works that address erosion and stability, incorporating geotechnical analysis.
- Ensure the designs adhere to the existing standards and project requirements.
- Estimate the quantity and prepare, technical specifications and performance criteria for construction materials.
- Produce detailed engineering drawings, including cross-sections, elevation plans, as built drawings and layout plans.
- Compile design documentation and design justification reports.
- Carry out numerical modelling and integrated system understanding (as required).
- Prepare detailed design of other interventions (if required).

#### **Task B2 Preparation of Bidding Documents:**

- Prepare estimates of quantities of construction, materials, equipment, and prepare cost estimates (financial and economic) with appropriate physical and price contingencies, and breakdown by major works items.
- Develop a detailed BOQ for all project activities, ensuring accuracy and comprehensiveness in engineering cost estimation based on the detailed designs.
- Set criteria for assessing the technical capability of bidders, including past experience, technical proposals, equipment and staffing capabilities.
- Establish criteria for financial evaluation, focusing on cost-effectiveness and financial stability of the bidders.
- Prepare Bidding Documents/ provide inputs for E-GP standard bidding document following the Government and the World Bank procurement regulations.

#### **Task B3: Preparation of E&S Documents**

Updating and Implementation of Environmental and Social Management Framework (ESMF), Resettlement Policy Framework (RPF), Stakeholder Engagement Plan (SEP), and Labor Management Procedure (LMP), SEA/SH Action Plan of the project will be an integral part of the Consultancy Services. Appropriate personnel from the consultancy team will be responsible for preparing, approving and reporting the safeguard documents as well as submitting monthly and quarterly reports to the Team Leader (TL). Environmental and

Social team/personal of the Consultant will coordinate with the PMU Environmental and Social Specialists during the preparation, and approval of safeguards documents/instruments.

#### **Environmental and Social Standard Requirement**

The main objective under Environmental and Health & Safety and Social and Gender is to conduct the environmental and social screening, identify the potential impact of project activities, collect and consolidate the field information, prepare all the required documents/reports, provide technical oversight on the project activities especially high-risk operations, provide support in the areas that require technical assistance by environmental, social and gender experts of PMU. Overall, the D&S consultant is responsible for the environmental and social compliance during the implementation in the field. The assignment includes the following tasks:

- Review and Update the Environmental and Social Management Framework (ESMF), Resettlement Policy Framework (RPF), Stakeholder Engagement Plan (SEP), SDA/SH Action Plan, Labor Management Procedure (LMP) if required in compliance with GoB and World Bank's requirements.
- Carry out Environmental and Social Screening and preparation of Screening Reports and plans (if required)
- Identification of impacts of the project activities and preparation of site-specific Impact Assessment Reports
- Preparation of site and activity specific ESMPs based on the impact assessments, and monitor the implementation
- Review and approval of Contractor's Environmental and Social Management Plans (C-ESMPs)
- Monitor the implementation of mitigation measures to minimize the Social and Environmental impacts of the project
- Ensure compliance of ESMPs during implementation
- Information consolidation and monthly and quarterly monitoring report
- Assist PMU in management of contractual obligation and ensure management of contractual obligation on environmental and social management in the field
- Provision of relevant trainings to PMUs, contractors and other relevant stakeholders
- Monitoring of Grievance Redress Mechanism
- Technical Advice to PMU field based Environmental and Social Consultants
- Arrange and conduct public consultations
- Environmental Monitoring in accordance with the ESMPs
- Ensure overall compliance of the works with GoB and World Bank's requirements,

#### **i. Environmental and Social (ES) Screening**

During pre-construction phase of any physical intervention, the ES team/personal of the D&S Consultants will review the detail project designs/site plan, and conduct site investigation to screen each physical intervention in accordance with ESMF, and RPF and any other applicable documents/instruments/guidelines to review potential impacts and check if the necessary environmental mitigation measures are planned and to advice if any additional mitigation measures are required. Screening format can be revised when required in consultation with the Environmental and Social Consultants of PMU. The screening reports need to be

reviewed and approved by the PMU Environment and Social Consultants. The ES team/personal will review secondary information and carry out reconnaissance for the screening to identify and characterize, in particular:

- a. Data collection of basic geographic, physical, topographic, geologic, hydrological etc. features of the sub-project areas
  - b. Important and sensitive environmental and social features and sensitive receptors, including but not limited to any natural habitats / critical habitats, areas of conservation importance, known presence of protected or threatened species, social/culturally sensitive sites/structures, GBV risks
  - c. Existing land and water use, nearby settlement patterns and topography, livelihood etc.
  - d. Known physical cultural resources or features
  - e. Likely environmental and social impacts in the sub-project areas/communities
  - f. Review the site-specific impact assessments to check if all impacts have been addressed or not and if all necessary mitigation measures have been included or not
  - g. Identify and address any additional impact arisen during construction phase such as labor influx, gender bias
  - h. Recommend if further detailed environmental and social assessments are required or not
  - i. Carry out social screening of road construction design and socio-economic survey of beneficiary and affected households of representative sample
  - j. Identify vulnerable groups in the resettlement process which includes female, children and disabled people in the affected locality
  - k. Carry out analysis of social inclusion, participation and gender issues and public health implication due to project interventions
- ii. Identification of impacts of project activities, prepare and update the site-specific impact assessment reports**
- a. The ES team/personnel will prepare the site and intervention specific impact assessment report based on the recommendations in screening reports and following the guidelines of the ESMF
  - b. When the screening result indicates the already prepared site-specific impact assessment lacks in any areas of impact, the ES team/personal will update the impact assessment and corresponding environmental and social management plan (ESMP), with the guidance of the Environmental and Social Consultants of PMU.
  - c. Design and carry out detailed measurement of losses – affected land, structure, trees, crops, and employment, income, business and industry - and identify Project Affected Persons (PAP) including non-titled owners and users of affected property (squatters, encroachers and tenants), and affected income earners as follows:
    - land user (residential and non-residential)
    - land user of physical assets (structures, crops, productive trees, shops)
    - small business and industry
    - household/person with potential impact of loss on income and livelihoods associated with businesses, industry and rental or productive assets

- community or group affected with their common property structures (sociocultural, religious, educational, and the like not defined as physical cultural resources)

**iii. Preparation and implementation of site and activity specific ESMPs**

- a. The ES team/personnel will prepare the site and activity specific ESMPs in accordance with the ESMF, based on the site-specific impacts which needs to be endorsed by PMU ES Consultants. ESMPs should be prepared following the GoB legislative provision and ESF of the World Bank taking into consideration of the location, importance and criticality of the interventions. Each ESMP will include a detail Bill of Quantities (BOQs) covering necessary costs associated with health, safety and environmental safeguards/management measures and enhancement works under the purview of the project ESMF.
- b. The ES team/personnel will update the ESMPs periodically and ensure the proper implementation of the ESMPs.

**iv. Information consolidation and reporting to PMU**

- a. The ES team/personnel will collect and consolidate information at any stage of the project implementation as required.
- b. The ES team/personnel will prepare the environmental screening and assessment reports under the guidance of Environmental and Social Consultants of PMU.
- c. The ES team/personnel will share consolidated monthly and quarterly progress monitoring report with the PMU.

**v. Assist PMU in management of contractual obligation**

- a. The ES team/personnel will assist Environmental and Social Consultants of PMU to ensure the ESF obligation of the project as well as to confirm the incorporation of the clauses into the legal agreement with the contractor. Such obligation would include implementation of the site-specific ESMP and any other applicable safeguard instruments.
- b. The ES team/personnel will report environmental and social impact management related non-compliance issues of contractors according to the project specific non-compliance rectification procedures and will assist for remedy action application.
- c. PMU is responsible to obtain necessary approval of Department of Environment and Consultant will assist PMU in this process.

**vi. Training Provision**

- a. The ES team/personnel will develop the training plan which will be approved by the PMU Environmental and Social Consultants.
- b. The ES team/personnel will organize trainings related to environmental, social, gender, health, and safety to raise the capacity of contractors and other relevant stakeholders to implement the ESMPs

and carry out required monitoring activities. Key topics to be focused on include nature conservation, occupational and community health and safety, and pollution management.

**vii. Monitoring of Grievance Redress Mechanism**

- a. The ES team/personnel will be an important part of the grievance redress mechanism (GRM) of the project. The team will monitor the incoming grievances, work towards resolving issues or coming to terms with complainants based on assessment of the problems, type of complaints, gravity of the situation

**viii. Technical Advice to PMU field based Environmental and Social Consultants**

- a. When necessary and required by PMU, the ES team/personnel will provide technical advice related to environmental and social aspects to the PMU. Such advice would include coordination with other relevant organizations/entities, formulation of strategies to address major issues and complaints, handling grievances, and enhancement of capacity of PMU.

**ix. Arrange and Conduct Public Consultations**

- a. The ES team/personnel will arrange and conduct consultation that will need to ensure that Project affected people and other stakeholders are informed about the Project activities and its possible impacts, as well as offered the opportunity to share their opinions and feedback to input into the environmental assessments, planning and design studies and their implementation in accordance with the Stakeholder Engagement Plan (SEP). For meaningful consultations with project-affected groups, communities, women of various age, persons with disabilities, elderly people, local NGOs and rights groups, all relevant documents must be provided in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted.

Detailed Assessment, Planning, and GIS-based Design for Embankment Upgrading and Canal Re-excavation

- Identify the footprint of the embankment for proposed additional areas and existing sections (if required) in terms of land ownership (private, BWDB owned, Khash etc.) and land use and location of environmental importance
- Collection of Mouza/cadastral map for land information of embankments
- Identification of proposed suitable location for (i) stock yards of soil heap for embankment; (ii) construction yards and (iii) disposal sites for unsuitable excavated material in connection with embankment upgrading and canal re-excavation
- Develop detailed designs of slopes and design/authorized crest level (ACL) that can easily be customized for specific site conditions, and determine criteria for similar zone embankment construction in light of available construction material, soil and topographic condition
- Assign suitable borrow pits for construction material and the guidelines for the specification and soil characteristics to be used for rehabilitation.

- Establish a GIS based system in which both engineering and social and environmental studies make use a consistent and uniform geo reference system which will allow proper alignment of these studies and avoid differences in the various deliverables.

#### Task C: Social Mobilization of Community Groups and Engagement of Local Communities

- Bangladesh's National Water Policy (1999) and Participatory Water Management Rule 2014 recognizes the role of all stakeholders in the management of water, and mandates their participation in any scheme to promote sustainability and to ensure the long-term integration of social and environmental considerations. In line with this mandate, the Bangladesh Water Development Board (BWDB) requires to promote principles of participatory water management within selected flood affected embankments to assist in the management of local water resources management schemes. Embankments and water resources infrastructure are closely linked, with the operation and maintenance of hydraulic structure and associated infrastructure acting as critical regulation mechanisms for water management.
- WMOs: BWDB will establish Water Management Organizations (WMOs) in each affected districts where investments will take place. WMOs will be responsible for the operation and routine minor maintenance following experience of the Integrated Planning for Sustainable Water Management (IPSWAM) Project/WMIP project /Blue Gold Program. Small works, including minor periodic maintenance and operation of minor hydraulic infrastructure would be undertaken by the WMOs under a memorandum of understanding with BWDB. The activities to be accomplished through the WMO are shown in the Table below:

**Table 2: Activities of WMO**

| Sl No. | Activity                        |
|--------|---------------------------------|
| 1      | Participatory Scheme Assessment |
| 2      | Consultations                   |
| 3      | Formation of Group              |
| 4      | Social Mobilization             |
| 5      | Planning and Technical Design   |
| 6      | Implementation                  |
| 7      | Operation of Scheme             |
| 8      | Routine Minor Maintenance       |
| 9      | Training                        |

- In order to successfully establish functioning and participatory WMOs, Model of Blue Gold Program or PSM process practiced in the World Bank aided WMIP project will be followed. This requires at least one year of intense work with local communities in the mobilization activities prior to the establishment of the WMOs. Besides, the IPSWAM model envisions the close coordination with local communities during the design phases of the project.
- The tasks for participatory scheme assessment, social mobilization, and community engagement for planning and technical design must all take place prior to the planned rehabilitation works being undertaken, and in close coordination with the contractor.
- The approach and methodology of social mobilization for Participatory Scheme cycle Management (PSM) will be benefited from review of (i) Bangladesh's National Water Policy 1999, (ii) Guidelines for

Participatory Water Management (GPWM), 2001, (iii) Guidelines for Integrated Planning for Sustainable Water Management (IPSWAM), iv) Participatory Water Management Rule 2014 (v) Framework for participatory scheme cycle management (PSM) from the Water Management Improvement Project (WMIP), (vi) Scheme maps of all the flood affected districts (vii) Cooperative Society (amendment) Act 2012, (viii) Sample constitutions of Water Management Groups (WMG)/Water Management Associations (WMA) from IPSWAM and WMIP projects; and (ix) any other information/documents deemed necessary.

- Manuals for beneficiary participation will be developed including information, education and communication materials for disclosure and awareness building. The methods of communication and participation will be mass beneficiary meeting, focused group meetings, and personal contact. The deliverables of the review and analysis of background documents and secondary information will be the following manuals/guidelines/Rule for management of the social mobilization activities:
  - Implementation manual for participatory scheme cycle management
  - Information, education and communication materials;
  - Sample By-Law for Water Management Groups and Water Management Associations;
  - Training curriculum for organizational management, supervision and quality control of civil works construction, income generation activities, and cooperatives management;
  - Manuals for organization management and operation and maintenance of water management schemes;
  - Manual for WMO Management by BWDB and any other plans and strategies identified necessary during project implementation;
  - Registration of all WMOs under Participatory Water Management Rule 2014;
  - IWRM practices with the help of reconstructed appurtenant structures;
  - Environmental Enhancement Plan prepared for the flood affected districts
  - Mechanism for conflicts resolution of beneficiaries
- Activities of beneficiaries at different stages of project cycle is attached in Annex-2

**Gender Mainstreaming:** Women in Bangladesh are traditionally the last resort of family economy at any crisis and contributing significantly to the economy. BWDB will follow a strategy of gender inclusive project design, implementation, and operation and maintenance. Women in the communities will be consulted at each stage of project cycle and their representation will be ensured in project management. The poor women will be employed in earth work through Labor Contracting Societies (LCS) and at least 30% of the members of the WMOs will be women. BWDB will provide gender-related training to sensitize its officials and increase capacity of the LCS and WMOs.

#### Task D. Construction Supervision, and Contract Managements

The Consultancy firm would be responsible for all construction supervision contracts. Being designated as the Project Manager/Engineer for the civil works, goods, and equipment supply and installation, the Consultants would be responsible for inspection and supervision of the construction works, installation of equipment and testing of construction material. They will ensure that the works implemented, and goods supplied are in accordance with the designs, specifications and terms and conditions of the relevant contracts and standards. The Consultants would assist the PMU Project Director to ensure that procurement of goods, services, civil works contracts is in accordance with the World Bank Policies and guidelines, the contract are signed and managed properly including any changes or variation orders necessary during implementation. This will also include assistance to BWDB in institutional setup for project implementation, training, setting

up of project office if needed, support in project implementation and procurement planning, carrying out procurement, financial management, contract management etc.

#### Task D1 Construction Supervision:

- Validate the detailed design and engineering surveys of the embankments, canals, hydraulic structure and bank and slope protections works and review all project documents including detailed design, specification, BOQ for the all the first contract packages
- Review and endorse working drawings prepared by contractors for the repair and rehabilitation of embankments, hydraulic structures, and canal re-excavation.
- Administer the civil works contracts and ensure that the project works are constructed in accordance with the provision of the contracts.
- Provide day-to-day supervision and inspection of the civil works at site, including carrying out pre-construction and post-construction surveys, by the provision of suitably qualified and experienced supervision staff.
- Keep the Employer informed of any delay or potential delays in the work schedule of the Contract, taking all necessary actions to prevent potential delays
- Regularly monitor and inspect the Contractor's quality control and assurance program to ensure that quality of that finished works meets the contract standards and specifications.
- Inspect and approve all material sources identified by the Contractors
- Testing of materials using both on-site and off-site depending on the needs, if necessary, in factory testing during manufacturing and inspection of good and material
- Maintain records of all testing work, including cross-referencing of items of work to which each test refers and location from which any samples were obtained for testing
- Measure the completed works and keep detailed records, including the measurement books
- Review and update operation, maintenance and management manuals for the facilities constructed under the project
- Provide hands-on training for maintenance of the completed embankment to BWDB and other concerned staff
- Assurance for proper demobilization and restoration of the construction sites after completion, O&M during warranty period by the Contractors

#### Task D2 Contract Management:

- Assist Project Director for contract administration and management.
- Prepare any required variation orders requested by the Employer and review any variation order proposed by the Contractor and advise the Employer in accordance with the contract
- Review all claims submitted by the Contractor and provide advice to the Employer on the validity of the claim, the effect of such claim on the construction schedule and the cost of the project
- Advise the Employer and instruct the Contractor in writing of issues related to delays and cost control.

- Establish factual time extension evaluation in case of extension requests and variation of work should be avoided as much as possible
- Review and approve the Contractor's implementation schedule and proposed personnel nominated in the contract
- Review contractor's submittals, verification of progress and interim payment requests and process interim and final payments to the Contractor (Interim monthly payment shall be based on interim payment certificate processed by the Consultant following claims filed by the Contractor)
- Prepare quarterly cash flow projections for the Employer in an acceptable format, in which cash flow should identify budget estimates for all outstanding works
- Maintain a day-to-day diary recording all events pertaining to the administration of the contract, request forms, and order given to the Contractor, and any other information which may at a later date be of assistance in resolving queries which may arise in connection with the execution of the works
- Contract works or goods acceptance and close of contract, issuance of completion certificates, and preparation of documents as required for acceptance of works/goods by BWDB
- Preparation of monthly progress reports including review and comment on the monthly progress reports submitted by the Contractor detailing the work undertaken during the previous month, the progress of the work against the approved schedule, the problems and difficulties encountered by the Contractor and other issues requested by the Employer. A S-curve analysis will be part of the reporting process.
- Advise and assist the Employer with respect to arbitration or litigation relating to the works, whenever required. The Consultancy firm will carry out all obligations provided by the (Project Director) in the Civil Works contracts. In the event of contractual dispute which may result in legal action, adjudication or arbitration between the Contractor and the Employer, and on the instruction, will collect prepare factual documentation which describes the circumstances of the dispute, and if required the Consultants would attend hearings.
- Establish a web based IT monitoring and supervision system to effectively supervise the implementation of the works (see Task E2).
- Prepare completion reports of the works

#### Task E 1: Project Management Support

The Consultants will provide support to BWDB in overall project management in activities such as preparation of project implementation plans, annual expenditure planning budgeting and financing forecast and plans, monthly reports and annual reports or work programs as required by the Government of Bangladesh and financiers of the project. They will also help in development of the procurement plans, contract management, financial management for which they would develop a system that can be linked with the Project Director or field units responsible for over financial management of the project. The plans would be updated on a regular basis as required by the BWDB.

The Consultants will support in obtaining site permits, construction permits, or any other permits or paper work which are necessary for the project and will act on behalf of the Owner as and when designated. The Consultants will support BWDB in procurements of works, goods and services under the project, preparation of bidding documents for such procurement, contract management and day to day management issues. The Consultants will prepare documents for the pre-qualification of the contractors and the prequalification

criteria. The consultants would also help the BWDB in pre-qualification process such as preparation of pre-qualification reports and invitation to pre-qualification, etc. The consultants will assist BWDB for writing terms of reference for any additional work that are to be carried out under the project for which additional services would be required and identified during project implementation. They will also provide technical assistance and training to the project staff and for that purpose prepare an overall training program for on-the-job training and possibly study tours based on the assessment of the training and technical assistance needs for the BWDB for implementation of the project and other programs. The training programs are likely to cover: (a) transfer of hydrologic/hydraulic models and on-the-job training as mentioned above; (b) project management, project planning, expenditures planning, budgeting; (c) preparation of detailed designs according to international standards, ESFs, RAPs; and (e) procurement and contract management.

**Workshops/ Seminars and Trainings.** As a part of consultation in course of planning and design phase, series of meetings/discussion sessions/ workshop will have to be organized from community through national level with various interest/beneficiary groups. In addition, it will be needed to involve the implementation agency and partners for effective transfer of technology. The consultant will prepare an overall plan with their approach to carry out this task of consultation and training for review and approval by BWDB. Thereafter, these will be organized in consultation, support and guidance from the Project/BWDB.

#### Task E 2: ICT Monitoring System

The overall responsibility of the Consultant under this task is to continue and further develop the ICT Monitoring System developed under CEIP-I. The specific tasks/responsibility are as follows:

- Conduct consultation meetings with the stakeholders and end-users to understand the requirements and expectations from the system;
- Analyze and identify requirements of the proposed system based on the requirements/expectations from the stakeholders/end-users;
- Documentation of the overall development and operationalization process (e.g. SRS, SDD, Database design, User Manual);
- Design and document all need assessments along with higher level relational design of each solutions and connections;
- Analyze and determine approximate budget and timeline for each of the proposed software, hardware, networks, apps, data center, capacity and operations;
- Assist the teams formulating policy needs subject to the rationality for technology adoption in the project;
- Oversee the procurement and installation of the hardware and hosting of the necessary software's;
- Build a custom, user-friendly, BWDB-branded interface with a login panel and launch the new application for download on Android. The app should be developed under the consideration that the monitoring reports would be generated by field level supervision engineers for the purposes of monitoring construction progress of infrastructure construction, maintenance as well as safeguard compliance (implementation of ESMP) under CEIP-1. The overall schematics should be aligned with Bangladesh National Digital Architecture;
- Create customized forms for monitoring reports that closely replicate and supplement the paper-based system that BWDB currently uses;
- Solicit feedback on the proposed user interface and forms from BWDB staff, including headquarters staffs and field level engineers and finalize based on feedback;

- Develop a dashboard - database monitoring systems accessible to assigned users in BWDB and PMU office showing the progress of construction by packages including implementation of ESMP, district, and upazila. A prototype may be developed to collect user feedbacks before developing full system;
- Develop database management system. The system should put in place edit trackers to fully capture edits made to submitted reports, draw attributes and analyze user-based statistics, as well as generate monthly reports;
- Supervision of system installation on equipment/hardware provided by BWDB, and conduct training sessions (both in headquarters and at the field level for field level engineers);
- Monitoring and oversight over rolling out the system during the project's implementation period. Regular communications should be kept with the client;
- Testing of the system in different stages of development;
- Study, analyze and review existing business processes, systems, procedures, Field data management and result sharing procedures, result analysis of various component, interactive mapping and operations to identify scope of ICT intervention;
- Identify potential and feasible scope of transformation into Monitoring Dashboard digital systems and understanding as well as documenting the modules;
- Analyze and identify potential area of integration along with integrating systems and agencies;
- After completion of the work, the system will be transferred to BWDB with all necessary documentations (SRS, SDD), Source codes, Database design etc.
- All intellectual properties will be handed over to the client
- Any other relevant task to ICT monitoring System required by the Team Leader.

## 5. Outputs of the Consultancy Firm/Deliverables

**Table 3: Deliverables of the Consultancy Firm**

| Deliverables                    | Description                                                                                                                                                                                                                                                                                                                          | Timeline     |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Inception Report                | <ul style="list-style-type: none"> <li>- Design and Supervision Methodology</li> <li>- Detailed Work Plan</li> <li>- Deployment schedule of key officials and staff</li> <li>- Monitoring and Evaluation strategy</li> <li>- Initial list of key indicators to develop baselines</li> <li>- Methodologies for site visits</li> </ul> | 2 months     |
| Detailed Design Analysis Report | <ul style="list-style-type: none"> <li>- Review of existing documentation and site investigations</li> <li>- Conduct detailed engineering surveys</li> <li>- Conduct numerical modelling and integrated system understanding.</li> <li>- Prepare detailed designs of embankments, bank</li> </ul>                                    | 10-12 months |

|                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                                                                                                                               | protection works, slope<br>protection works, regulating<br>structures, canals and other<br>works as required<br>- Prepare (review and<br>update) E&S frameworks<br>and plans including<br>household surveys,<br>mapping affected people                                                                                                                                                                                                                                                                                                    |  |
| Regular Reports (Monthly<br>Activity Report, Quarterly<br>Summarized Report,<br>Assessment Report, Final<br>Report, any other reports<br>required by the PMU) | - Summarize the tasks with<br>detailed physical and<br>financial progress of the<br>works<br>- Summary of the work<br>completed<br>- Implementation status of<br>ESMF, SEP, RPF<br>- result of environmental and<br>social screening,<br>environmental & social<br>impact of project activities<br>and mitigation measures<br>taken<br>- Report on progress<br>- Assessment and analysis of<br>the project outcome<br>- Process monitor<br>- Procurement documents for<br>the works, goods and<br>services<br>- Project completion reports |  |
|                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |

## 6. Team Composition

Team compositions (estimated) are shown below:

**Table 4: Key Professionals**

| Position                       | Quantity | Man Month | Total Man Month | Type of Position |
|--------------------------------|----------|-----------|-----------------|------------------|
| Team Leader (International)    | 1        | 18        | 18              | Intermittent     |
| Deputy Team Leader             | 1        | 36        | 36              |                  |
| Design Engineer                | 1        | 18        | 18              | Intermittent     |
| Construction Resident Engineer | 1        | 24        | 24              | Intermittent     |
| Procurement/Contract           | 1        | 15        | 15              | Intermittent     |

|                                          |   |    |    |              |
|------------------------------------------|---|----|----|--------------|
| Management Specialist                    |   |    |    |              |
| Geo-Technical Specialist                 | 1 | 10 | 10 | Intermittent |
| Construction Supervision Engineer        | 2 | 24 | 48 |              |
| Quality Control Specialist               | 1 | 36 | 36 |              |
| Senior Estimator                         | 1 | 15 | 15 | Intermittent |
| Environmental Specialist                 | 1 | 24 | 24 | Intermittent |
| Senior Hydrologist (Modeling)            | 1 | 6  | 6  | Intermittent |
| Resettlement Specialist/Sociologist      | 1 | 24 | 24 | Intermittent |
| Senior Community Mobilization Specialist | 1 | 3  | 3  | Intermittent |
| Community Mobilization Specialist        | 1 | 3  | 3  | Intermittent |
| GIS and Mapping Specialist               | 1 | 8  | 8  | Intermittent |
| Senior Software Manager                  | 1 | 4  | 4  | Intermittent |
| Mobile app+ Web application Developer    | 1 | 6  | 6  | Intermittent |
| Frontend Developer                       | 1 | 3  | 3  | Intermittent |
| System Analyst and Database              | 1 | 6  | 6  | Intermittent |

**Table 5: Non-Key Professional/ Supporting Staff**

| Position        | Quantity | Man Month | Total Man Month |
|-----------------|----------|-----------|-----------------|
| Field Engineers | 8        | 36        | 288             |
| Data Enumerator | 4        | 9         | 36              |
| CAD Operator    | 2        | 15        | 30              |
| Office Manager  | 1        | 40        | 40              |

# 6A. Key Professionals

**Table 6: Qualification, Experience and Responsibility of Proposed Key Professionals**

| Sl. No | Position           | Academic Qualification                                                                        | Desirable years of professional experience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------|--------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.     | Team Leader        | Minimum MSc in Civil Engineering/ Water Resource/ Hydraulic Engineering / Coastal Engineering | <p>a) 20 years relevant experience, with 5 years' experience as a Team Leader position in a World Bank / similar institution financed project as part of detailed design construction supervision and project management support consultancy service.</p> <p>b) Areas of specialization should encompass but not limited to: hydraulic structures, embankments, revetments and groynes, rehabilitation of coastal defense systems, inland waterways, river morphology, bank protection, soil conservation, water management, master planning, economic analyses, institutional strengthening, feasibility studies, and leading the design and supervision of large-scale infrastructure projects.</p> | <p>a) Prepare project work plans, schedules</p> <p>b) Leading and managing a multidisciplinary consultancy team for water resources planning, construction supervision &amp; project management, Contract Management and detailed design</p> <p>c) Maintain liaison with BWDB and other related agencies</p> <p>d) Co-ordinate with PD Office and design team</p> <p>e) Guide and supervise the project activities</p> <p>f) Comparison of the alternative plans and find out the suitable solutions</p> <p>g) Preparation of different reports as required for the services</p> |
| 2.     | Deputy Team Leader | B.Sc degree in Civil Engineering/ Water Resource/ Hydraulic Engineering                       | <p>a) 15 years relevant experience, with 5 years of experience as a Deputy Team Leader/ Similar position</p> <p>b) Experience of working in disaster management project in World Bank or similar institution funding project would be an additional qualification.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>a) Experience as Deputy Team Leader of detailed designs and construction management, supervision &amp; monitoring of at least one major building construction project of similar size.</p>                                                                                                                                                                                                                                                                                                                                                                                    |

| Sl. No | Position | Academic Qualification | Desirable years of professional experience | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------|----------|------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |          |                        |                                            | <p>b) He/She should have professional experience in the field of structural engineering both in RCC and Steel Structures.</p> <p>c) Assist the team leader in guiding and supervising the project activities and contract management,</p> <p>d) Devise potential options for water management and risk assessment</p> <p>e) Formulation of implementation and O&amp;M plan</p> <p>f) He should have knowledge and experience of national and international design code, standard, methods etc. for analyzing and designing of hydraulic structures.</p> <p>g) Preparation of Bid documents, settlement of contractual claims and resolution of disputes following "Public Procurement Rules of Bangladesh" and Bank's Guideline</p> <p>h) Fluent in English speaking and capable in writing English reports. Preparation of Technical and Progress report.</p> |
|        |          |                        |                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|        |          |                        |                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Sl. No | Position                       | Academic Qualification                                        | Desirable years of professional experience                                                                                                                                                                                                                | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                                                                                                           |
|--------|--------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.     | Design Engineer                | Bachelor Degree in Civil / Water Resources Engineering        | a) 12 years of professional experience with at least 8 (eight) years of experience in planning and design of hydraulic structures and construction/re-sectioning of embankment<br>b) Previous experience in similar working environment will be preferred | a) Design of the alternative structures recommended for the solutions of the drainage and flood problem<br>b) Design of link canal, peripheral embankment and other ancillary structures<br>c) Design of drainage, Re-sectioning of embankment, design of bank/slope protection works and design of re sectioning of embankment drainage etc.<br>d) Assist in preparation of different reports as required for the proposed study |
| 4.     | Construction Resident Engineer | Minimum Bachelor Degree in Civil/ Water Resources Engineering | a) 12 years of professional experience with 8 (eight) years of experience in the relevant field like construction supervision of all types of hydraulic structures<br>b) Previous experience in similar working environment will be preferred             | a) Construction Supervision of embankment and different types of hydraulic structures such as construction/re-sectioning of embankment, construction of bank/slope protection works and re sectioning of drainage channels etc.<br>b) Conduct testing of materials in the laboratory and monitor testing of materials outside the                                                                                                 |

| Sl. No | Position                                    | Academic Qualification                                                                | Desirable years of professional experience                                                                                                | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------|---------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                             |                                                                                       |                                                                                                                                           | laboratory and certify all these test reports to confirm the standard of materials.<br>c) Preparation of quarterly progress report and half yearly progress report.<br>d) Preparation of time schedule for successful completion of construction works within the schedule time.<br>f) Scrutinize the design drawing for appropriateness of the design before starting the construction works.<br>g) Check the quality of materials to be used in the construction works<br>h) The construction of hydraulic structures will follow the testing of concrete in the laboratory etc. i) Assist in preparation of different reports as required by the team leader |
| 5.     | Procurement/ Contract Management Specialist | Minimum Bachelor degree in civil engineering/ MBA / Masters in economics/ Procurement | 12 years working experience in processing the procurement of goods, works and services with 5 years' experience in Donor financed project | a) Prepare specifications/terms of reference for procuring all kind of goods, equipment, works and services in accordance with the policies and guidelines<br>b) Prepare bidding document for the year program and                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Sl. No | Position                          | Academic Qualification                                | Desirable years of professional experience                                                                                                                                              | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                                                                                                     |
|--------|-----------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                   |                                                       |                                                                                                                                                                                         | assist BWDB up to the point of Contract award<br>C) Contract Management During Implementation                                                                                                                                                                                                                                                                                                                               |
| 6.     | Geo-Technical Specialist          | Masters in Civil/Geo-technical engineering/Geology    | 12 years of professional experience with at least 5 years' experience in soil-boring & other geological aspects                                                                         | a) Assess need based Geo-technical information<br>b) Data collection, Quality control, analysis and compilation.<br>c) Soil-boring & other geological aspects.<br>d) Preparation of different reports as required for the project                                                                                                                                                                                           |
| 7.     | Construction Supervision Engineer | Bachelor Degree in Civil/ Water Resources Engineering | 10 years of professional experience with 8 (eight) years' experiences in the relevant field like construction supervision of all types of hydraulic structures implemented by the BWDB. | a) Construction Supervision of different types of hydraulic structure such as construction/re-sectioning of embankment, construction of bank/slope protection works, repair of hydraulic structures and re sectioning of drainage channels etc.<br>b) Preparation of monthly, quarterly progress report and half yearly progress report.<br>c) Preparation of time schedule for successful completion of construction works |

| Sl. No | Position                   | Academic Qualification                                        | Desirable years of professional experience                                                    | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                                                                                                   |
|--------|----------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                            |                                                               |                                                                                               | <p>within the schedule time.</p> <p>d) Scrutinize the design drawing for appropriateness of the design before starting the construction works.</p> <p>e) Check the quality of materials to be used in the construction works</p> <p>f) The repair of hydraulic structures will follow the testing of concrete in the laboratory etc. Re-sectioning of embankment will follow necessary testing as per specifications.</p> |
|        |                            |                                                               |                                                                                               | g) Assist in preparation of different technical reports as required by the team leader                                                                                                                                                                                                                                                                                                                                    |
| 8.     | Quality Control Specialist | Minimum bachelor Degree in Civil/ Water Resources Engineering | 10 years of professional experience with 8 (eight) years of experience in the relevant field. | <p>a) To maintain the quality of works for construction/re-sectioning of embankments, construction of bank/slope protection works and re-sectioning of drainage channels etc.</p> <p>b) To conduct laboratory test of materials and match with the desired test results before starting of construction works.</p>                                                                                                        |

| Sl. No | Position                 | Academic Qualification                                                                | Desirable years of professional experience                                                                                                                                                                                                        | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                       |
|--------|--------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                          |                                                                                       |                                                                                                                                                                                                                                                   | <p>c) All types of field test equipment's shall be collected well ahead the commencement of construction works</p> <p>d) Unsuitable materials shall be removed from the field with due attention.</p> <p>e) Obtain test results of materials and test results of concrete by hand testing equipment at the time of starting of the works.</p> |
|        |                          |                                                                                       |                                                                                                                                                                                                                                                   | <p>f) Formulate the format for test results for easy verification.</p> <p>g) At any cost quality of all types of construction works has to be ensured by the specialist.</p> <p>h) Assist in preparation of different reports as required by the team leader</p>                                                                              |
| 9.     | Senior Estimator         | Bachelor Degree in Civil/ Water Resources Engineering or Diploma in Civil Engineering | 10 years of professional experience with 8 (eight) years of experience in the relevant field for BSc Degree Engineer.<br>Or<br>20 years of professional experience with 8 (eight) years of experience in the relevant field for Diploma Engineer. | a) Estimating of quantity of BOQ items, schedule of rates, drawing of building and road contracts and preparation/checking of civil works' measurement/ bills                                                                                                                                                                                 |
| 10.    | Environmental Specialist | Minimum Masters' degree in Environmental Engineering/ or Water Resources              | 12 years working experience in Environmental Impact Assessment and 8 yrs experience World Bank / similar donorfunded project                                                                                                                      | a) Environmental screening, site specific impact assessments, mitigation measures                                                                                                                                                                                                                                                             |

| Sl. No | Position                            | Academic Qualification                                                           | Desirable years of professional experience                                                                                                                                                                                                                                                          | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                                                                            |
|--------|-------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                     | Engineering/Geo graphy                                                           |                                                                                                                                                                                                                                                                                                     | and oversee the compliance of Environmental Management Plan (EMP)<br>b) Ensure environmental foot print is properly addressed<br>c) Assess the baseline environmental condition<br>d) Assess the potential impacts of the project activity on surrounding environment<br>e) Assist to prepare different types of report to the Team Leader.                                                        |
| 11.    | Senior Hydrologist (Modelling)      | Minimum Masters in Civil Engineering/Water Resources Engineering/ relevant field | a) 10 years of professional experience is required with minimum 5 years' experience in numerical modelling and integrated system understanding<br>b) Previous experience in flood/hydrological disaster forecasting<br>c) Previous experience and familiarity with hydrological observation systems | a) Assist the Team Leader and act as the focal for all the modeling related tasks (as required).<br>b) Reviewing all the tasks related to hydrology and morphology and support PMU, PD and respective field officials for smooth implementation and management.<br>c) Review the deliverables of the hydrology related consultancies and any other relevant packages of the project (if required). |
| 12.    | Resettlement Specialist/Sociologist | Minimum Masters' degree in sociology/                                            | Minimum 12 years of working experience in design of Resettlement Action Plan (RAP)                                                                                                                                                                                                                  | a) Design and carry out stakeholders' consultation                                                                                                                                                                                                                                                                                                                                                 |

| Sl. No | Position                                 | Academic Qualification                                          | Desirable years of professional experience                                                                                                                                    | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------|------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                          | economics/social welfare                                        | for the project affected persons (PAPs)                                                                                                                                       | including focused group discussions for collecting local information on social condition, cultural values<br>b) Design survey for inventory of losses and Project Affected Persons, and for valuation of affected assets.<br>c) Manage stakeholder consultation frame, socio-economic survey, detail measurement of loss of assets, census of Project Affected Persons (PAP), and property valuation.<br>d) Review legal and policy guidelines related to land resettlement and population displacement due to the project interventions.<br>e) Review project design, boundaries of project interventions and implementation schedule |
| 13.    | Senior Community Mobilization Specialist | Masters in Social Science (Sociology/ Social Welfare/Economics) | 12 years of experience in carrying out social livelihood studies, assessing social need for sectoral development including participatory water management and leading project | a) Overall planning, supervision, implementation of the assignment<br>b) Supervising the activity of the team members including field team                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Sl. No | Position                          | Academic Qualification                                          | Desirable years of professional experience                                                                                          | Desirable Specific Task/ Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------|-----------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                   |                                                                 |                                                                                                                                     | c) Planning for conducting beneficiary survey<br>d) Designing survey tools<br>e) Planning and designing stakeholders' need assessment survey<br>f) Preparing modalities of WMO formation and formation of WMOs<br>g) Preparing monthly progress report<br>h) Preparing mid-term and final reports<br>i) Make necessary arrangement for Preparation of GIS maps for each WMU And WMO's to be formed in that WMU<br>j) Keeping liaison with BWDB, World Bank, Main Consultant etc. |
| 14.    | Community Mobilization Specialist | Masters in Social Science (Sociology/ Social Welfare/Economics) | 8 years of experience in carrying out social studies linked with rural development and livelihood and initiate public participation | a) Overall planning for stakeholder participation activities<br>b) Overall supervision of institution building and the stakeholders' participation activities<br>c) Conduct focus group discussions and participatory approaches of engagement such as PRA<br>d) Supervising the participation related work of field team members                                                                                                                                                |

| Sl. No | Position                   | Academic Qualification                                         | Desirable years of professional experience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Desirable Specific Task/ Responsibility                                                                                                                                                                                           |
|--------|----------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                            |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | e) Planning and designing stakeholders' need assessment survey<br>f) Preparing modalities of WMO formation<br>g) Formation of WMOs                                                                                                |
| 15.    | GIS and Mapping Specialist | BSc (hons) Geography & Env. Science/ URP/CSE/EEE/ Physics      | Minimum 5 years relevant experience in GIS, remote sensing, mapping, google earth, AutoCAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | a) Identify the strategy for GIS and RS database, analysis<br>b) Preparation of site map<br>c) Collection of data of the resettlement affected area<br>d) Guide survey/data collection<br>e) Co-ordinate with the field surveyors |
| 16     | Senior Software Manager    | Minimum B.Sc in Computer Science / Computer Engineering (CSE). | <ul style="list-style-type: none"> <li>• 12 years total working experience in ICT industry focusing responsibility on Technology management and planning;</li> <li>• At least 8 years' experience in developing open-source set of tools</li> <li>• At least 5 years practical exposure in Solution Design/Development/Requirement Analysis;</li> <li>• At least 5 years' experience in ICT Project Management;</li> <li>• Working experience in telecom services, software integration services and Government data related planning are needed;</li> <li>• Experience of working with any project/agency</li> </ul> | a) Support the continuation and further development of ICT monitoring system developed under CEIP-I to BSTRONG Project (BWDB Part).                                                                                               |

| Sl. No | Position                              | Academic Qualification                                         | Desirable years of professional experience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Desirable Specific Task/ Responsibility                                                                                             |
|--------|---------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|        |                                       |                                                                | <ul style="list-style-type: none"> <li>of Government of Bangladesh is needed;</li> <li>• Experience of working with development agencies is expected;</li> <li>• International exposure on ICT education or assignment or engagement with international agencies would add quality values;</li> <li>• Experience in Monitoring and Evaluation of System Implementation will be a plus</li> </ul>                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                     |
| 17     | Mobile app+ Web application Developer | Minimum B.Sc in Computer Science / Computer Engineering (CSE). | <ul style="list-style-type: none"> <li>• Minimum 8 years total working experience in ICT industry focusing responsibility on Technology management and planning;</li> <li>• At least 3 years' experience in developing open-source set of tools</li> <li>• At least 3 years practical exposure in Solution Design/Development/Requirement Analysis;</li> <li>• At least 3 years' experience in ICT Project Management;</li> <li>• Working experience in telecom services, software integration services and Government data related planning are needed;</li> <li>• Experience of working with any project/agency of Government of Bangladesh is needed;</li> <li>• Experience of working with development agencies is expected;</li> </ul> | a) Support the continuation and further development of ICT monitoring system developed under CEIP-I to BSTRONG Project (BWDB Part). |

| Sl. No | Position           | Academic Qualification                                         | Desirable years of professional experience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Desirable Specific Task/ Responsibility                                                                                             |
|--------|--------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|        |                    |                                                                | <ul style="list-style-type: none"> <li>• International exposure on ICT education or assignment or engagement with international agencies would add quality values;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                     |
| 18     | Frontend Developer | Minimum B.Sc in Computer Science / Computer Engineering (CSE). | <ul style="list-style-type: none"> <li>• Minimum 8 years total working experience in ICT industry focusing responsibility on Technology management and planning;</li> <li>• At least 3 years' experience in developing open-source set of tools</li> <li>• At least 3 years practical exposure in Solution Design/Development/Requirement Analysis;</li> <li>• Experience in data analytics and dashboard design</li> <li>• Experience in usability and prototyping will be a plus</li> <li>• Working experience in telecom services, software integration services and Government data related planning are needed;</li> <li>• Experience of working with any project/agency of Government of Bangladesh is needed;</li> <li>• Experience of working with development agencies is expected;</li> <li>• International exposure on ICT education or assignment or engagement with international agencies would add quality values;</li> </ul> | a) Support the continuation and further development of ICT monitoring system developed under CEIP-I to BSTRONG Project (BWDB Part). |
|        |                    |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                     |
|        |                    |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                     |
|        |                    |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                     |
|        |                    |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                     |

| Sl. No | Position                    | Academic Qualification                                         | Desirable years of professional experience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Desirable Specific Task/ Responsibility |
|--------|-----------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| 19     | System Analyst and Database | Minimum B.Sc in Computer Science / Computer Engineering (CSE). | <ul style="list-style-type: none"> <li>• Minimum 8 years total working experience in ICT industry focusing responsibility on Technology management and planning;</li> <li>• At least 3 years' experience in system analysis and database design</li> <li>• At least 3 years practical exposure in Solution Design/Development/Requirement Analysis;</li> <li>• Working experience in telecom services, software integration services and Government data related planning are needed;</li> <li>• Experience of working with any project/agency of Government of Bangladesh is needed;</li> <li>• Experience of working with development agencies is expected;</li> <li>• International exposure on ICT education or assignment or engagement with international agencies would add quality values;</li> <li>• Experience in Cyber security</li> </ul> |                                         |

#### 6B. Non-Key Professionals

**Table 8: Qualification, Experience and Responsibility of Proposed Non-Key Professionals**

| Sl. No. | Position        | Academic qualification                | Desirable years of professional experience                                    | Desirable Specific Tasks                                                                                                                                                                                              |
|---------|-----------------|---------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.      | Field Engineer  | Diploma in civil engineering          | Minimum 7 years of experience in construction supervision and field engineer. | a) Activities assigned to specific task<br>b) Detailed survey of the project area                                                                                                                                     |
| 2.      | Data Enumerator | Minimum HSC/Diploma in any discipline | Minimum 3 years of experience in relevant field                               | a) Collect and verify data in survey<br>b) Ensure proper running of databases by means of timely data input<br>c) Work under the guidance of a supervisor<br>d) Contribute to preserving data confidentiality         |
| 3.      | CAD Operator    | Diploma in engineering                | Minimum 3 years of experience in AutoCAD design                               | a) Detail design and drawings<br>b) Data management skill                                                                                                                                                             |
| 4.      | Office Manager  | Graduate in any discipline            | Minimum 2 years of experience in relevant field                               | A) Support team with administrative task<br>b) Managing filing system<br>c) Monitor office expenditures and handle all office contracts (rent, service etc.)<br>d) Monitor office supplies inventory and place orders |

#### 7. Duration of the Assignment

The Consultant firm shall perform the Services for 40 months. However, the duration will also depend on performance of the firm.

#### 8. Institutional Arrangement

The Consultancy Firm will be responsible to the PD. Firm will assist PD to ensure that all resettlement related reporting is completed on time to enable the Project to meet the deadlines of various GoB authorities and

the World Bank and will submit the field visit report frequently along with the recommendation for further improvement. The PMU will provide necessary assistance to the Consultancy Firm in carrying out their activities under the project. The PMU will not provide necessary office accommodation, computer, logistic services, consumables and other things or related services required for smooth execution of their services. Necessary provisions are provided in reimbursable expenses and consultant has to manage by themselves as per contract. The PMU will provide all necessary reports and documentation free of charge.

#### 9. Procurement/Hiring Method

The Consultant will be selected following Quality and Cost Based Selection (QCBS) as set forth in the World Bank Procurement Regulations for IPF Borrowers, February 2025.

Annex-1: Activities of Beneficiaries at Different Stages of Project Cycle in Social Mobilization of Community Group

**Table 2: Activities of Beneficiaries**

|                                  |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Participatory Assessment      | Scheme | <ul style="list-style-type: none"> <li>a. Design and carry out PRA with BWDB's field office and divisional office</li> <li>b. Conduct information campaign in the locality</li> <li>c. Identification of beneficiaries and stakeholders</li> <li>d. Collect information on social, environmental, technical and economic aspects</li> <li>e. Prepare report which will be benchmark for planning and monitoring for scheme development</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2. Social Mobilization           |        | <ul style="list-style-type: none"> <li>a. Identify the beneficiary villages of the water management schemes and boundaries of Water Management Units (WMU). Enroll at least 75% of households as a member of WMGs. Prepare household list for each WMO unit in order to work out the percentage of enrollment</li> <li>b. Carry out beneficiary census and identify existing and/or potential members of Water Management Organizations (WMO) including Water Management Groups (WMG) for each Water Management Unit (WMU) and Water Management Association (WMA)</li> <li>c. Carry out participatory training needs assessment and prepare a program for capacity building of BWDB field officials and WMO representatives.</li> <li>d. Carry out the capacity building program including training in coordination with BWDB's Staff Development Unit.</li> <li>e. Conduct introductory level training curriculum for WMGs/WMA on Participatory Water Management, Income Generating Activities etc.</li> </ul> |
| 3. Planning and Technical Design |        | <ul style="list-style-type: none"> <li>a. Assist the engineering and economic team in improvement plan with the WMO's/community organizations to arrive at an agreed plan</li> <li>b. Assist PMU, BWDB and Develop Memorandum of Understanding (MOU)</li> <li>c. The WMOs will also agree on taking over their responsibility in O&amp;M during operation</li> <li>d. Develop mechanism/tools for O &amp; M fund collection</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4. Implementation                |        | <ul style="list-style-type: none"> <li>a. Formation of Construction Supervision Team (CST) from the members of WMGs/WMA and disseminate project design and works specifications to the WMA members with assistance from the engineering consultants and BWDB field and division offices.</li> <li>b. Develop participatory monitoring plan for the WMAs with assistance from the engineering consultants and BWDB field office</li> <li>d. Develop a procedure for CST to coordinate the social issues with contractor, consultant and BWDB field officials during construction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                      |

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        | <p>e. Facilitate the Construction Supervision Team (authorized members of WMA for supervision - CST) and assist them in communicating observations to the BWDB field office and the consultants.</p> <p>f. Document the process for monitoring of civil works to assist the CST and gradually train them up to do all proceedings by their own.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 5. Operation and Maintenance of Scheme | <p>a. Introduce the WMO and WMA members with the water control structures, irrigation and drainage channels and the embankment and disseminate operation and maintenance details of those components.</p> <p>b. Discuss and sort out minor O&amp;M activities that are plausible for the WMOs to implement during operation of the scheme.</p> <p>c. Develop O&amp;M Plan for the WMAs with reference to major activities as responsibility of the BWDB division offices.</p> <p>d. Design and develop draft Agreements for signing between WMAs &amp; BWDB in respective schemes on the responsibilities of routine O&amp;M through active participation of the WMOs</p> <p>e. Facilitate the WMOs in the operation and routine maintenance and assist them in communicating observations for major repair and maintenance to the BWDB division offices.</p> |

