TERMS OF REFERENCE (TOR)

for

Technical Assistant (TA) Consultancy for Feasibility Study of Water supply, Sanitation and Waste Management
at Moulvibazar, Kulaura & Sreemangal Municipality of Moulvibazar district.

1 Background:

Bangladesh, having an area of 144,415 sq.km is one of the world's most populous countries. The country with an estimated population of 170 million maintains a steady growth in per capita income that stands at around US$ 2,827 in 2021. During recent years, it's economic conditions have improved. Bangladesh's performance against the Millennium Development Goals (MDG) was impressive in most of the indicators. Bangladesh needs more efforts in improving its growth rate to move up to the middle-income country by 2024 and eliminating poverty by 2030. On the other hand, accelerated efforts will be needed for achieving the Sustainable Development Goal (SDG) targets in water supply, sanitation and hygiene targets (SDG 6.1 and SDG 6.2).

In this backdrop, creating access for women, children and the most vulnerable to safe water, sanitation, and hygiene (WASH) services and infrastructure is critical for meeting the targets. The national vision as articulated in the Eighth Five Year Plan 2021-2025 and the Perspective Plan of Bangladesh 2021-2041, is to accelerate progress towards achieving the SDG targets for WASH. As per the revised Monitoring and Evaluation (M&E) framework (April 2020) of SDGs, Bangladesh aims to achieve 100% coverage of safely managed water supply and 80% safely managed sanitation including hand hygiene facilities by 2030.

The need for safely managed water supply, Sanitation and Waste Management system are critical in the places other than plain land especially in hilly regions and where ground water is scarce. Some of the urban regions are under the district of Moulvibazar need to be brought in development interventions of WASH and waste management services. Moulvibazar, Kulaura & Sreemangal Municipality under Moulvibazar District are very important in terms of challenges of providing safe water supply, improving the sanitation coverage and introducing innovative waste management services. The ground water in those areas are not adequate and sustainable for 100% coverage. Ground water quality is also a question for providing solution. In Sreemangal, many of the industrial and commercial developments will accommodate residential facilities for their staff and workers. The Sanitation scenario in this area largely hinges on household on site pits and tanks, which are sporadically cleaned regrettably. During cleaning, the fecal matter is disposed of in drains and open areas, posing a serious public health risk. Additionally, the challenges of municipal waste management, drainage issues, and flooding further compound the situation Technical expertise pertaining to piped water supply and fecal sludge management remains limited areas all tiers of municipalities

The projected population capacity in the proposed areas are as follows

Municipality	Land area	Projected Population (approx.)
Moulvibazar	10.36	90,224
Kulaura	11.25	38170
Sreemangal	2.58	51,080

It is assumed that the coverage of existing piped water supply services in Moulvibazar is around 40%, in Sreemangal is around 30%. There is no piped water supply system in Kulaura Municipality. To address and cope with the anticipated urban growth in the project area, the government of Bangladesh has allocated essential funds for preparing a comprehensive feasibility study on Safe Piped Water Supply, Safely

Managed Sanitation and Waste Management system. Department of Public Health Engineering (DPHE) is now initiating technical assistance (TA) service for necessary assessment of the development activities, components design and investment plant for improving the status of sustainable WASH and waste management services in the proposed project areas.

2 Objectives:

The overall goal of this TA consulting service is to prepare effective plan and necessary documents for ensuring safe, reliable, adequate and equitable water supply services, safely managed sanitation system, integrated wastes management plant consists of solid waste & faecal sludge management system to the citizen of the study area. With this goal, the specific objectives are to:

(a) Comprehensive study on Water, Sanitation & Waste management for upgradation and increasing of service coverage in the proposed municipalities.
(b) Prepare conceptual design, documents and drawings for the safe water supply, distribution and sanitation system management in the project area.
(c) Assessment of the potentiality of integrated municipal waste management system including conceptual design, documents, drawings and upgradation of existing facilities in the project area.

3 Scope of the Work:

The consultant shall perform the following activities/ tasks, at minimum, to accomplish the above service objectives and to ensure the project's outcome;

a) **Review previous studies and secondary data:** Previous studies (if available) will be reviewed and data to be collected can include the type, location, and capacity of water supply, safely managed Sanitation, Waste Management, water-treatment assets; water & Sanitation service coverage, inventory of existing water facilities. Socioeconomic data to be collected including population density, population trends, the location of slums, existing development plans and zoning resolutions; Data to be collected on physical characteristics including topography, land use, roads, ground contour, water resources etc;

b) **Primary data acquisition:** Where data are insufficient, baseline survey will be conducted on water use, water sources, land level (as required), water quantity and quality, and to determine current condition for water resource assessment. To assess ground water/surface water source, geological investigation will be carried out where necessary;

c) **Water, Sanitation and Waste Management Demand Assessment & Source Identification:** Based on the population projection water, Sanitation and Waste Management demand has to be assessed for future scenarios. The assessment shall include daily and seasonal variation of water demand. The study has to review the water demand by households, commercial, and other entities etc. Identification and assessment of probable sources for water supply including groundwater, rivers, springs, lake and other surface water bodies. The consultants shall use standard methods of identifying water source of surface water, groundwater and rainfall runoff, probable other alternative and/or combined.

d) **Study of water treatment requirement:** Based on findings from water quality analysis water treatment process has to be selected for different water sources. The suitability of different water supply technologies in terms of technical feasibility and ease of operation and maintenance has to be assessed;

e) **Transmission and distribution system:** Water transmission and distribution network has to be assessed in terms of technical feasibility and ease of operation & maintenance;
f) **Mapping:** Prepare a digital map of the assessment results using geographic information system (GIS). The GIS-based digital map has to show physical, social, infrastructure, administrative features of the project area and also various model results;

g) **Required developments:** Assessment of future water treatment, transmission and distribution system requirement including but not limited to DTWs, surface water intakes and treatment plants, reservoirs, OHTs, water distribution mains and distribution network, consumer connections tariff setting & billing etc.
h) **Integrated waste management:** Integrated approach of municipal solid waste & faecal sludge management process will be executed thought a systematic series of future actions, ensuring efficient collection, transportation, segregation and proper disposal of various waste materials, treatment, reuse, resource recovery & assessment of business model.
Efforts will be directed towards repairing and maintaining damaged or flooded toilets, particularly focusing on marginalized households. Improved Containment system, such as Septic tank, DWATs and pits will be promoted.
i) **Environmental and social assessment:** In order to understand the environmental and social implication of the water supply project, Initial Environmental Examination (IEE) / Initial Social Assessment (ISA) has to be done for the project area;
j) **Design, drawings and estimates:** Preparing conceptional design, drawings and tentative cost estimates need to be done of technically feasible & optimum options for water supply;
k) **Workshop:** Workshop has to be conducted for dissemination of study findings among the members of technical committee;
l) **Economic analysis:** Based on the outline design, project cost will be estimated and required economic analysis will be done to justify the investment which will include: EIRR, IRR, BCR etc.

4. Project Area

The proposed service location is Moulvibazar, Kulaura & Sreemangal Municipality under Moulvibazar District of Sylhet Division, Bangladesh.

5 Development Activities

The intended activities needs to be capable of laying technical foundation for design and construction of the water supply, Sanitation, Waste management system in the project area, and providing essential decision-support for future planning and O&M. The planning process shall consist of three major components:

- Collection and compilation of data and analytics;
- Definition and outline design of the facility requirements with alternatives;
- An organized development plan for water and documentation;

5.1 The consultant shall essentially collect/collet/conduct/study/analyze/assess/prepare/do the following elements (but not limited to) in the process:

- Background information on the water supply system along with status of previous and contemporary projects to be implemented in the study area;

- Describe the existing system, establishment and service facilities in detail by performing a baseline questionnaire survey (physical setting, demography, socio-economic status, water demand, source condition, existing infrastructure and institutions, water quality and treatment systems, etc);
- Policy and regulatory requirements;
- Water demand-supply, sources identification, Public sanitation and hygiene facilities, Solid Waste Management Process, Fecal Sludge Management and other drivers;
- Water supply and Waste Management infrastructure and it's O&M requirement;
- Long-term sustainability plans (institutional arrangement, human resources, financing and cost arrangement, tariff structure, data management, M&E and regulations, etc.);
- Financial and economic analysis of all investments and development works;
- Assessing climate change impacts and initial environmental examination (IEE);
- KII & FGD at various stages of the plan development process;
- Collaboration and integration with other stakeholders, plans, projects, etc.
- Provisions for community engagement in the service chain and decision-making;

6. Input, Qualification & Experience Requirements and Responsibilities for the required Staff;
This assignment is for 6 months.

Required Key Staff					
SI.	**Position**	**Man month (Person)**	**Education Requirements**	**Experience Requirements**	**Responsibilities Assigned in the Service**
1	Team Leader (Water Supply Engineer)	06 (01)	Minimum Master's degree in Civil Engineering/ Water Resources Engineering/ Hydro-informatics or equivalent.	S/he should have at least 15 years' overall experience in water resources/urban water supply planning management. Previous experience in water supply project development, management and implementation. S/he should have experience in at least 2 similar projects in the position of TL or DTL. Minimum 10 years' experience in the use of network modeling and hydraulics, particularly experience in design of water distribution systems using standard software like EPANET or Water Gems or InfoWater. Particular experience in designing water treatment system including master plan preparation will be given preference.	• Fully responsible for all aspects of design, planning, liaison and reporting; • Provide advice and direct the technical groups specially to lead the modeling and design study team; • Suggest and formulate option scenarios for the study; • Identify the most suitable location for the water treatment plant and intake; • Plan and assist in designing treatment plant, it's components, raw water and clean water transmission line; • Prepare present and future water demand projection, analyze the data using computer-based program, prepare the outline hydraulic design of pipe network; • Guide in preparing the drawing, specification and estimates of pipe network, treatment plant and other water infrastructure; • Prepare project planning, schedules and time frame for work and the publications of reports; • Attend meetings as and when required; • Responsible for quality control of output of the study;

Required Key Staff					
Sl.	**Position**	**Man month (Person)**	**Education Requirements**	**Experience Requirements**	**Responsibilities Assigned in the Service**
					• Contribute and review the reports and give suggestions for improvement.
2	Civil / Structural Engineer	03 (01)	Minimum of Master's degree in Civil Engineering with major in structure or equivalent	S/he should have at least 15 years of overall professional experiences with minimum 10 years working experience in designing hydraulic structures including WS infrastructure.	• Perform the outline design of various types of structures related to the proposed water supply, Sanitation and Waste Management Plan.
3	Hydrogeologist	03 (01)	Minimum of Master's degree in Geology, Hydrogeology, Engineering Geology, physical, or earth science, or in the related field.	S/he should have at least 15 years working experience in water resources development projects. Adequate experience in designing production tube wells, pumping test, geophysical investigation shall be treated as added advantage.	• Conduct hydro geological investigation; • Determine characteristics of the aquifer system through lithology and borehole logging; • Examine performance of existing operational PTWs, • Provide guidance for aquifer testing and drilling new wells
4	Pipe Network Specialist	02 (01)	Minimum of Master's degree in Civil Engineering/ Water Resources Engineering/ Hydro-informatics or equivalent.	S/he should have at least 10 years of practical experience in pipe line network planning, design and analysis using computer based applications & modeling.	• Develop water network models to support the planning, designing and analysis of the proposed water supply system including zoning, service pressure assessing etc.
5	Solid Waste & Fecal Sludge Management Specialist	02 (01)	Minimum of Master's degree in Civil Engineering/ sanitary Engineering/ Water Resources Engineering or equivalent.	S/he should have at least 10 years of practical experience in Solid Waste & Fecal Sludge Management planning, design as an integrated approach.	• Develop models of Public sanitation and hygiene facilities, Solid Waste Management Process, Fecal Sludge Management. To support the planning, designing and analysis of the proposed Solid Waste & Fecal Sludge Management system.
6	GIS Specialist	03 (01)	Minimum of Bachelor Degree in Civil Engineering / Water	S/he should have at least 10 years' practical experience in working with GIS mapping and planning. S/he	• Prepare ArcGIS based geo-referenced maps of the project area;

Required Key Staff					
Sl.	**Position**	**Man month (Person)**	**Education Requirements**	**Experience Requirements**	**Responsibilities Assigned in the Service**
			Resources Engineering / Urban and Rural Planning/Hydrology/ Geography or equivalent	should have adequate experience in pre and post processing of data required for model application and result interpretation.	• Prepare maps of water source, supply, sanitation improvement projects using GIS applications; • Prepare maps and presentation materials for reporting & preparing.
7	Socio- Economic Expert	03 (01)	Minimum of Master's degree in social sciences or equivalent	S/he should have at least 10 years' working experience in the relevant discipline. Higher degree and experience in the relevant field will be an added advantage.	• Design and plan the requirement for SIA surveys of communities in the project area; • Identify future probable social impacts of the project; • Arrange interaction meeting with different stakeholders; • Reporting the SIA; • Collect all related information for carrying out economical and financial analyses; • Carry out economical and financial analyses for the proposed investment; • Conduct necessary socio-economic survey;
8	Environmental Specialist	03 (01)	Minimum of Master's degree in Civil Engineering/ Water Resources/ Environmental Engineering/science or equivalent.	S/he should have at least 10 years' experience in water resources management, EIA studies, Environmental Management. Previous hands on experience in coordinating IEE, EIA issues for a large water resources assessment and management studies will be treated as added advantage.	• Conduct environmental study and prepare IEE; • Analyze and identify significant adverse environmental effects and mitigation measures to reduce or eliminate these adverse effects linked with the intended project; • Provide recommendations on the proposed project sites in terms of water resource allocation, probable waste generation/management complying the existing act,

Required Key Staff					
SI.	**Position**	**Man month (Person)**	**Education Requirements**	**Experience Requirements**	**Responsibilities Assigned in the Service**
					regulation, policies and guidelines for it's future implementation. • Will prepare necessary files & documents for DOE clearance for the proposed infrastructures.
9	Electro-Mechanical Engineer	01 (01)	Minimum of B.Sc in Engineering in the related disciplines (Electrical/Mechanical). Master's degree in the related field will be preferred.	Minimum 10 years experiences in the design, selection and installation of mechanical/electro mechanical devices of which at least 5 years' experience in water supply and waste management projects.	• Consult with the design team and performed electro-mechanical design of all water supply and waste management infrastructure linked with related project structures.

Non-key Staff Requirement			
S.N.	**Proposed Staff**	**Required Person No.**	**Man-month requirement**
9	Junior Engineer	03	6
10	AutoCAD Specialist	01	3
11	Enumerator/Surveyor	06	6
	Sub-total		**15**

**Distributed over the duration of the contract period*

The consultant may include additional experts in their proposal which is subjected to the approval by the client linked with the intended scope & outcomes.

7. Reporting Requirements with a Tentative Schedule:

SI.	Report/Submission	Summary of Contents	Time of Submission	Mode of Submission	Number of Copies
1	Inception Report	• Summary of activities as executed during project inception phase. • Summary of mobilized resources. • WASH & waste management plan. • Updated and approved study work plan. • Work methodology. • Full team description including their task and responsibilities.	• Within fifteen (15) calendar days from the date of contract signing. • The consultant shall incorporate comments made by the client, if any, within Seven (07) calendar days after those comments are received, and resubmit.	• Both printed and soft copies.	• Three (3) printed copies in A4 page size. • Soft copies in a CD/DVD/Memory stick.
2	Monthly Progress Report	• Monthly progress summary with outputs of each task. Any survey work, inventory, baseline etc. to be included in the progress report.	• At the end of every month from the date of contract signing. • The consultant shall incorporate comments made by the client, if any, within Seven (07) calendar days after those comments are received, and resubmit.	• Both printed and soft copies.	• Three (3) printed copies in A4 page size. • Soft copies in a CD/DVD/Memory stick.
3	Draft Final Report	• Detailed contents of the for the project area, • Outline Design, drawings including estimates of components of the proposed water supply infrastructure, • Network database (in CAD or GIS file formats as appropriate) • Collection & transportation of waste to the potential plant for waste management.	• At least fifteen (15) days before completion of the contract period.	• Both printed and soft copies.	• Three (3) printed copies in A4 page size. • Soft copies in a CD/DVD/ Memory sticks. • Design drawings will be supplied in A3 page size.

SI.	Report/Submission	Summary of Contents	Time of Submission	Mode of Submission	Number of Copies
5	Final Report/ Final deliverables.	• Updated contents of the Draft Final Report after incorporation of comments made by the client, and the reflections obtained in the workshop. All the deliverables in the final form, ready for development and implementation.	• Within fifteen (15) calendar days after receiving the comments from the client.	• Both printed and soft copies.	• Six (6) printed copies in A4 page size. • Soft copies in a CD/DVD/ Memory sticks. • Design drawings will be supplied in A3 page size.

8. Service Period

The TA consulting service will have duration of six (6) months from the date of contract signing. The service is expected to commence from March 2024.

9. Deliverables

The consultant shall submit the following deliverables under the contract.

a) Project inception report

b) monthly progress reports

c) A comprehensive water, Sanitation, Waste management Development Plan including the findings of geophysical investigation etc.

d) Conceptual/outline technical design and cost estimates supported by CAD/GIS drawings.

e) Survey/investigation/ baseline/primary or secondary data acquired during conducting the study.

f) To conduct a project output sharing workshop for validation of the plan developed under the assignment including the workshop output.

g) Final report of feasibility study need to be submitted as government prescribed form.

10. Counterpart Facilities

DPHE shall provide office space for the consultants where necessary. DPHE will also provide all available information and previous relevant project related documents to the consultant and help for communications to the Municipal Authority.

11. Ownership of Documents

a) DPHE shall be the owner of all the software, design, reports, modules, manuals and other documents prepared and equipment procured under the service.
b) After completion of the service all documents/results/tools, equipment and all necessary software should be handed over to DPHE before final payment.

12. Source of Fund:

Funds for the conducting the software development will be sourced from GOB Fund, provided by the 'DPHE revenue Budget.

13. The intended consulting firm shall be a national engineering consulting firm having wide experience in preparing master plan/detailed engineering design on water supply, water treatment and other related activities. The firm should have at least 10 years' experiences in professional services linked with water supply, Sanitation, Waste management infrastructure development with an overall 15 years' business experiences.

14. Mode of Payment:

- Upon submission and acceptance of Inception Report - 20%
- Upon submission and acceptance of Midterm Report including Baseline Report, Assessment Report and Proposed Infrastructural Design Report. - 20%

- Upon submission and acceptance of the estimates of potential infrastructure of Water, Sanitation and Waste management components for study areas including detailed mapping and modeling. - 30%
- Upon submission and acceptance of Final Report - 30%

Necessary Income tax (IT) and VAT will be deducted at source from the payment as per the rules of the Government of Bangladesh.

15. TA Consultant Selection Process:

To select TA Consultant, DPHE will follow Service procurement process and will invite Expression of Interest (EIO) requesting basic information of the interested Engineering Consulting Firms, regarding qualification and experiences for undertaking the assignment. After evaluating the shortlisted, firms will be requested to submit their technical and financial proposal for the assignment. The proposal will be evaluated in accordance with the procuring guideline using quality and cost based selection (QCBS) method.