NORTHERN ELECTRICITY SUPPLY PLC

REQUEST FOR EXPRESSION OF INTEREST (EOI)

FOR

Appointment of Consulting Firm for Detailed Feasibility Study (DFS), Initial Environmental Examination (IEE), Environmental and Social Impact Assessment Study (ESIA), Route Survey (RS), Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP) Studies for Electrification of Char Ashariadaha, Rajshahi.

Selection Method: Quality and Cost Based Selection (QCBS)

Ref. No.: 27.29.0000.000.013.07.0006.26-136, Date: 02.07.2026

July, 2026

INSTRUCTION TO THE APPLICANTS

1. Application of the interested firms must include:

a. Name of the Principal Firm with complete address, Fax, Telephone Nos. and E-mail address etc.
b. Name of the Associated Firm (if any) with complete address, Fax, Telephone Nos. and E-mail address etc.
c. Notarized Joint Venture/Consortium/Association Agreement (JVCA) on Non-Judicial Stamp of the firms (in case of Joint Venture/Association with another firm) for the said consulting services. The value of Non-Judicial Stamp should be Tk. 300.00 (Three hundred Taka).
d. The name of the employees/owner(s) of the firms and corporate profile of the firms.
e. The name and qualification of the Management/Administrative Personnel of the firms.
f. List and qualifications of the key personnel are likely to be involved in the proposed consulting services.

The proposed fields of expertise for the said consulting services would be the following:

Sl. No	Position	Category	Nos.	Month	Person-month
	Key Expert				
1	Team Leader	National	1	3	3
2	Senior Design Engineer (River Crossing Tower)	National	1	1	1
3	Design Engineer (Submarine Cable Crossing)	National	1	1	1
4	Design Engineer (RTW-River Training Work)	National	1	0.75	0.75
5	Electrical Engineer (Solar Power Plant)	National	1	1	1
6	Structural Expert	International	1	0.75	0.75
7	Horizontal Directional Drilling (HDD) Expert	National	1	1	1
8	Substation and Transmission/ Distribution Line Engineer	National	1	1.5	1.5
9	Economic & Financial Expert	National	1	1	1
10	Environmental Expert/EIA Specialist	National	1	1	1
11	Hydrologist	National	1	1	1
12	Route Survey Expert	National	1	1	1
	Non- Key Expert				
13	Morphological Modelling Specialist	National	1	1	1
14	Geotechnical Engineer	National	1	0.5	0.5
15	Land Acquisition & Resettlement Specialist	National	1	1	1
16	Sociologist	National	1	0.5	0.5
17	Agriculture Expert	National	1	0.5	0.5
18	Fisheries Expert	National	1	0.5	0.5
19	RS/GIS Specialist	National	1	1	1
20	Data Analyst/ Survey Specialist	National	1	2.5	2.5
21	Disaster Management Specialist	National	1	0.75	0.75
22	Biodiversity/ Ecologist	International	1	0.75	0.75
23	AutoCAD Expert	National	1	1.75	1.75
			Total	**24.75**	**24.75**

g. Identity, Structure, Organogram of the firm(s) including copies of the documents defining the constitution or legal status, place of registration and principal places of business and/or principal offices of the firm(s).
h. Details of vehicles, instruments & office equipment of the firm's own.
i. Audited Financial Statements of the firm for the last five fiscal years.
j. Experience of the firms along with a list of similar work at hand or carried out during last 10 years. The Consultant must submit the end user certificate in support of experience.
k. The Consultant should submit the signed CV of the proposed professional staff. The CV must contain a photograph of the experts.

2. Applicant must submit information using the attached table/format [Section-1 to 6] properly with the document. The submitted document must be sealed and signed by a person duly authorized by the consulting firm.

Section 1: Curriculum Vitae (CV)

Photo

Curriculum Vitae (CV) for Each Proposed Professional Staff (CV will be maximum within five (05) pages (Short Biography) & the Consulting Firm shall have to be Submitted a soft copy of Section 1 along with EOI document.)

1.	Proposed Position for this Project	:	*[From the Terms of Reference, state the position which the consultant will be engaged. Only one candidate shall be nominated for each position]*
2.	Name of Person	:	*[State full name]*
3.	Date of Birth	:	
4.	Nationality	:	
5.	Mobile No. and E-mail Address	:	
6.	Membership of Professional Associations	:	*[State rank and name of society and year of attaining that rank]*
7.	Education	:	[*list all the colleges/universities which the consultant attended, stating degrees obtained, and dates, and list any other specialized education of the consultant*]
8.	Other Training	:	[*Indicate significant training since degrees under Education were obtained, which is pertinent to the proposed tasks of the consultant*]
9.	Languages & Degree of Proficiency	:	Language / Speaking / Reading / Writing e.g. English / Fluent / Excellent / Excellent
10.	Countries of Work Experience	:	
11.	Employment Record [*Starting with present position, list in reverse order every employment held and state the start and end dates of each employment*]	:	[*The Consultant should clearly distinguish whether as an "employee" of the firm or as a "Consultant" or Advisor" of the firm*] [*The Consultant should clearly indicate the position held and give a brief description of the duties in which the Consultant was involved*]
	Employer 1	:	From: To:

		[e.g. January 2019]	[e.g. December 2024]
Employer 2	:	From:	To:
Employer 3	:	From:	To:
Employer 4	:	From:	To:

12.	Work Undertaken that Best Illustrates Your Capability to Handle this Assignment	:	*[Give and outline of experience and training most pertinent to tasks on this assignment, with degree of responsibility held. Use about half of a page A4].*

Certification *[Do not amend this certification]:*

I, the undersigned, certify that (i) I was not a former employee of the Client immediately before the submission of this proposal, and (ii) to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications, and my experience. I understand that any wilful miss-statement described herein may lead to my disqualification or dismissal, if engaged.

Signature

Date:

Day/Month/Year

Section 2: Name and Qualification of Management/Administrative Personnel

Serial No	Name of the Personnel	Position at the Firm	Temporary/ Permanent	Educational Qualification (Name of the Exam----------, Passing year-------, University---------)	Experience in Years

Note: The applicant shall have to be submitted a soft copy of Section 2 along with EOI document.

Section 3: Financial Statement

Summary of Assets & Liabilities:

SL	Year	2021-2022	2022-2024	2023-2024	2024-2025	2025-2026
1.	Liquid Assets					
2.	Total Assets					
3.	Net Worth					
4.	Total Liabilities					
5.	Profit after Taxes					
6.	Turnover					

Note: In support for the above documents, Audited Financial Statement must be provided. Otherwise, application will not consider for evaluation. The applicant shall have to be submitted a soft copy of Section 3 along with EOI document.

Section 4: Details of Vehicles, Instrument and Office Equipment

Serial No	Name, Brand of the Vehicles/Equipment, Year of Manufacture	Model No., Serial No./Registration No.	Present Condition

Note: The applicant shall have to be submitted a soft copy of Section 4 along with EOI document.

Section 5: Similar Experience of the Firm

The following format should be used to indicate the similar experience of the firm in projects.

Project Name		
Project Location	Start Date (M / Y)	Completion Date (M / Y)
Name of the Client with address and Contact Number		
Contract Amount in USD/EURO/BDT		
Name of the Associated Firm (if any)		
Narrative description of actual service provided by the firm for the project:		

Name of the Firm: ----------

Signature of the authorized signatory: ----------

Note: 1. Experience must be supported by a certificate issued by respective Client. Otherwise, application will not consider for evaluation.

2. The applicant shall have to submit a soft copy of Section 5 along with EOI document.

Section 6: Experience of the Firm in other Works

Serial No	Name of Services	Name of Client with address and Contact number	Contract Amount	Start Date	Completion Date

Note: 1. Experience must be supported by a certificate issued by respective Client. Otherwise, application will not consider for evaluation.

2. The applicant shall have to submit a soft copy of Section 6 along with EOI document.

Section 7: Terms of Reference (ToR)

[PACKAGE No: C-04]
FEASIBILITY STUDY [FS] CONSULTANT

FOR "Detailed Feasibility Study (DFS), Initial Environmental Examination (IEE), Environmental and Social Impact Assessment Study (ESIA), Route Survey (RS), Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP) Studies for Electrification of Char Ashariadaha, Rajshahi"

PROJECT BACKGROUND

Northern Electricity Supply PLC (NESCO) commenced commercial operation on 1st October 2016 as part of the Government of Bangladesh's power sector reform program to improve accountability, efficiency, and service quality in the generation, transmission, and distribution sectors.

NESCO, a power distribution utility, an enterprise of Bangladesh Power Development Board (BPDB), provides reliable and affordable electricity services to consumers in 16 districts under the Rajshahi and Rangpur Divisions, covering 39 upazila towns and urban areas through its 60 Sales and Distribution Divisions/Electricity Supply Units.

According to the **National Human Development Report (NHDR)** prepared by the **Economic Relations Division (ERD)**, Bangladesh is expected to become the 24th largest economy in the world by 2030 and a developed country by 2041. To support this national vision and the achievement of the Sustainable Development Goals (SDGs), NESCO is undertaking a project titled **"Capacity Building and Rooftop Solar System Implementation in NESCO Islands & Substations."**

As part of this initiative, NESCO plans to extend electricity supply services to **Char Ashariadaha**, an island located in the Padma River that currently has no access to grid electricity, by identifying the most suitable, reliable, and sustainable electrification solution.

1. NESCO has requested a technical assistance (TA) from the Asian Development Bank (ADB) for an assessment of the Appointment of Consulting Firm for Detailed Feasibility Study (DFS), Initial Environmental Examination (IEE), Environmental and Social Impact Assessment Study (ESIA), Route Survey (RS), Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP) Studies for Electrification of Char Ashariadaha, Rajshahi.

For extending electricity supply services to Char Ashariadaha, which currently has no access to grid electricity, NESCO Needs to Appoint a Consulting firm for *Detailed* ***Feasibility Study (DFS), Initial Environmental Examination (IEE), Environmental and Social Impact Assessment Study (ESIA), Route Survey (RS), Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP) Studies***. The overall objective of the assignment is to identify, justify, and develop the most appropriate, sustainable, reliable, and cost-effective solution for electrification of Char Ashariadaha and to prepare all necessary studies, assessments, and documentation required for successful project implementation.

The Consultant shall conduct detailed field investigations, site surveys, demand assessment, technical studies, and other necessary assessments of the project area. Based on the findings of the field studies and evaluation of all available alternatives, the Consultant shall identify, justify, and recommend the most appropriate, technically feasible, environmentally sustainable, socially acceptable, and cost-effective solution for electrification of Char Ashariadaha.

The Consultant shall prepare an **Alternative Assessment Report** comparing all feasible options based on technical, financial, economic, environmental, social, operational, implementation, and life-cycle cost considerations. The recommended option shall be submitted to NESCO for review and approval before commencement of Phase 2 activities

Upon approval of the preferred electrification option by NESCO, the Consultant shall undertake all studies, surveys, assessments, and documentation necessary for project implementation.
The outcome shall include a **bankable Detailed Feasibility Study Report (FSR)** and shall be summarized in the Planning Commission's specified format (Annexure-1).

NESCO requires the selected option to be implemented through a Turnkey EPC Contractor within the shortest possible time. Therefore, the Consultant shall prepare a bankable Detailed Feasibility Study Report, Complete Environmental Impact Assessment (EIA), Initial Environmental Examination (IEE), Environmental and Social Impact Assessment (ESIA), Route Survey (RS), Land Acquisition Plan (LAP), Resettlement Action Plan (RAP), and all other required environmental and social safeguard documents, including studies related to power evacuation transmission/distribution lines to the nearest grid substation where applicable.
The Consultant shall also prepare and recommend all necessary technical, environmental, social, financial, economic, procurement, implementation, and safeguard measures required for investment decision-making and successful project implementation.

1. Implementation arrangements: The Project will be implemented by the *NESCO (* the Client). A Project Implementation Unit (PIU) will be established within the Client organization to coordinate, manage, monitor and evaluate all aspects of Project implementation.

2. Project description: The overall objective of these studies is to conduct the detailed Feasibility Study of the Project , Initial Environmental Examination (IEE), Environmental and Social Impact Assessment Study (ESIA), Route Survey (RS), Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP) Studies of Electrifying **Char (island) Ashariadaha** by envisaging financial viability, environmental sustainability and social acceptability.

3. Previous work: N/A

4. Previous investigations and surveys: N/A

5. Related Projects: N/A

6. Project costs and financing: The Project's estimated cost is *US$ 2.00 million*, which will be financed by a maximum of *US$ 1.96 million* grant from ADB.

PURPOSE OF THE ASSIGNMENT

Northern Electricity Supply PLC (NESCO) is planning to extend electricity supply services to Char Ashariadaha, which currently has no access to grid electricity. The overall objective of the assignment is to identify, justify, and develop the most appropriate, sustainable, reliable, and cost-effective solution for electrification of Char Ashariadaha and to prepare all necessary studies, assessments, and documentation required for successful project implementation.

Phase 1: Assessment of Electrification Alternatives and Selection of Preferred Method
To ensure a sustainable, reliable, and cost-effective power supply to the inhabitants of the Char Ashariadaha, NESCO is considering the following electrification alternatives:

1. **Electrification through Submarine Cable including Landing-station Installation using Horizontal Directional Drilling (HDD) Technology**
    - Installation of underground/submarine power cable beneath the riverbed using HDD technology, including construction of landing stations and associated electrical infrastructure.
2. **Electrification through River Crossing Transmission/Distribution Towers**
    - Construction of river crossing towers and overhead power lines to transmit electricity across the Padma River to the island.
3. **Electrification through Solar Power Plant with Battery Energy Storage System (BESS)**
    - Development of a standalone solar photovoltaic (PV) power plant integrated with a battery energy storage system to provide electricity to the island population.

The Consultant shall conduct detailed field investigations, site surveys, demand assessment, technical studies, and other necessary assessments of the project area. Based on the findings of the field studies and evaluation of all available alternatives, the Consultant shall identify, justify, and recommend the most appropriate, technically feasible, environmentally sustainable, socially acceptable, and cost-effective solution for electrification of Char Ashariadaha.

The Consultant shall prepare an **Alternative Assessment Report** comparing all feasible options based on technical, financial, economic, environmental, social, operational, implementation, and life-cycle cost considerations. The recommended option shall be submitted to NESCO for review and approval before commencement of Phase 2 activities.

Phase 2: Detailed Feasibility Study and Project Preparation for the Selected Method
Upon approval of the preferred electrification option by NESCO, the Consultant shall undertake all studies, surveys, assessments, and documentation necessary for project implementation.

The outcome shall include a **bankable Detailed Feasibility Study Report (FSR)** and shall be summarized in the Planning Commission's specified format (Annexure-1).

NESCO requires the selected option to be implemented through a Turnkey EPC Contractor within the shortest possible time. Therefore, the Consultant shall prepare a bankable Detailed Feasibility Study Report, Complete Environmental Impact Assessment (EIA), Initial Environmental Examination (IEE), Environmental and Social Impact Assessment (ESIA), Route Survey (RS), Land Acquisition Plan (LAP), Resettlement Action Plan (RAP), and all other required environmental and social safeguard documents, including studies related to power evacuation transmission/distribution lines to the nearest grid substation where applicable.

The Consultant shall also prepare and recommend all necessary technical, environmental, social, financial, economic, procurement, implementation, and safeguard measures required for investment decision-making and successful project implementation.

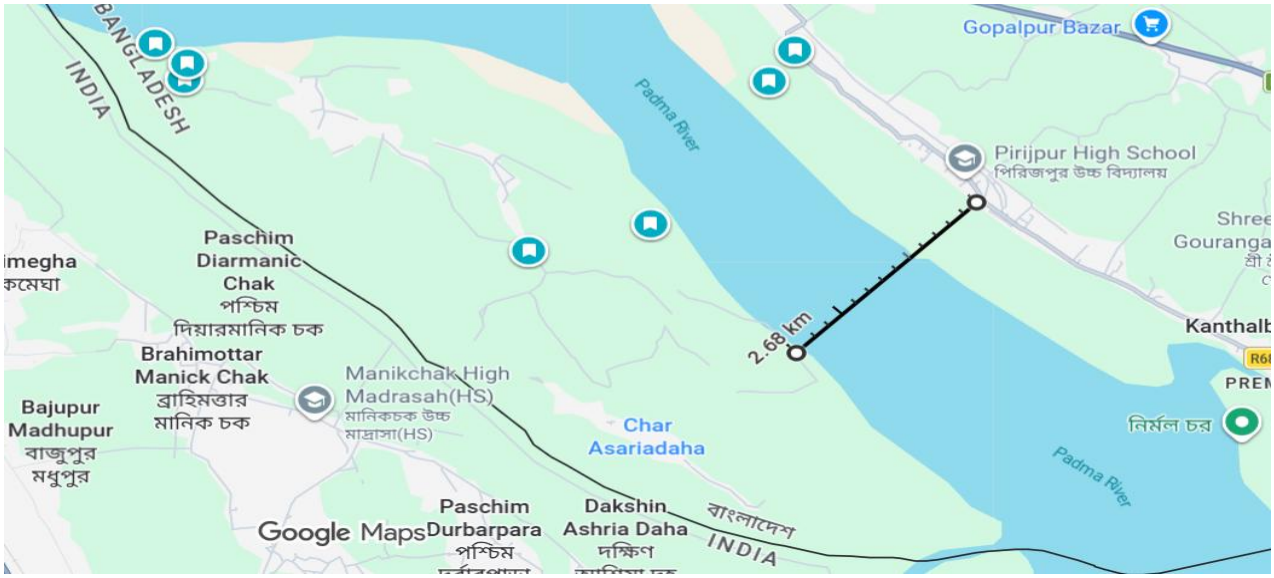
All conditions of this ToR are aimed at selecting a suitable consulting firm to carry out the consulting services for the Project. The consulting services assignment requires a team of consultants with extensive experience in designing Solar PV Power Plants with Battery Energy Storage Systems (BESS), installing River Crossing Transmission/Distribution Towers, and laying Submarine Cables using HDD Technology including Landing Stations.

The result of the feasibility study will inform NESCO's decision-making process regarding the best approach to power the island.

DURATION AND LOCATION OF THE SERVICES

Location: Geographical Location of Char Ashariadah Union

- Char Ashariadah Union is a riverine union under Godagari Upazila in Rajshahi District.
- The GPS coordinates of the union are 24°24'19.91"N, 88°19'40.05"E (Google Maps screenshot attached).
- The union is surrounded by the Padma River and is characterized by its Char (river island) landscape.
- The existing width of the Padma River varies seasonally, ranging from approximately 2.5 km to 3.5 km.
- The estimated population of the union is around 40,000, comprising approximately 7,500 households.
- Based on the preliminary load assessment, the present peak electricity demand of Char Ashariadaha is estimated at approximately 3 MW. Considering future population growth, socioeconomic development, and increased electrification needs, the peak demand is projected to reach approximately 7.4 MW by 2050.



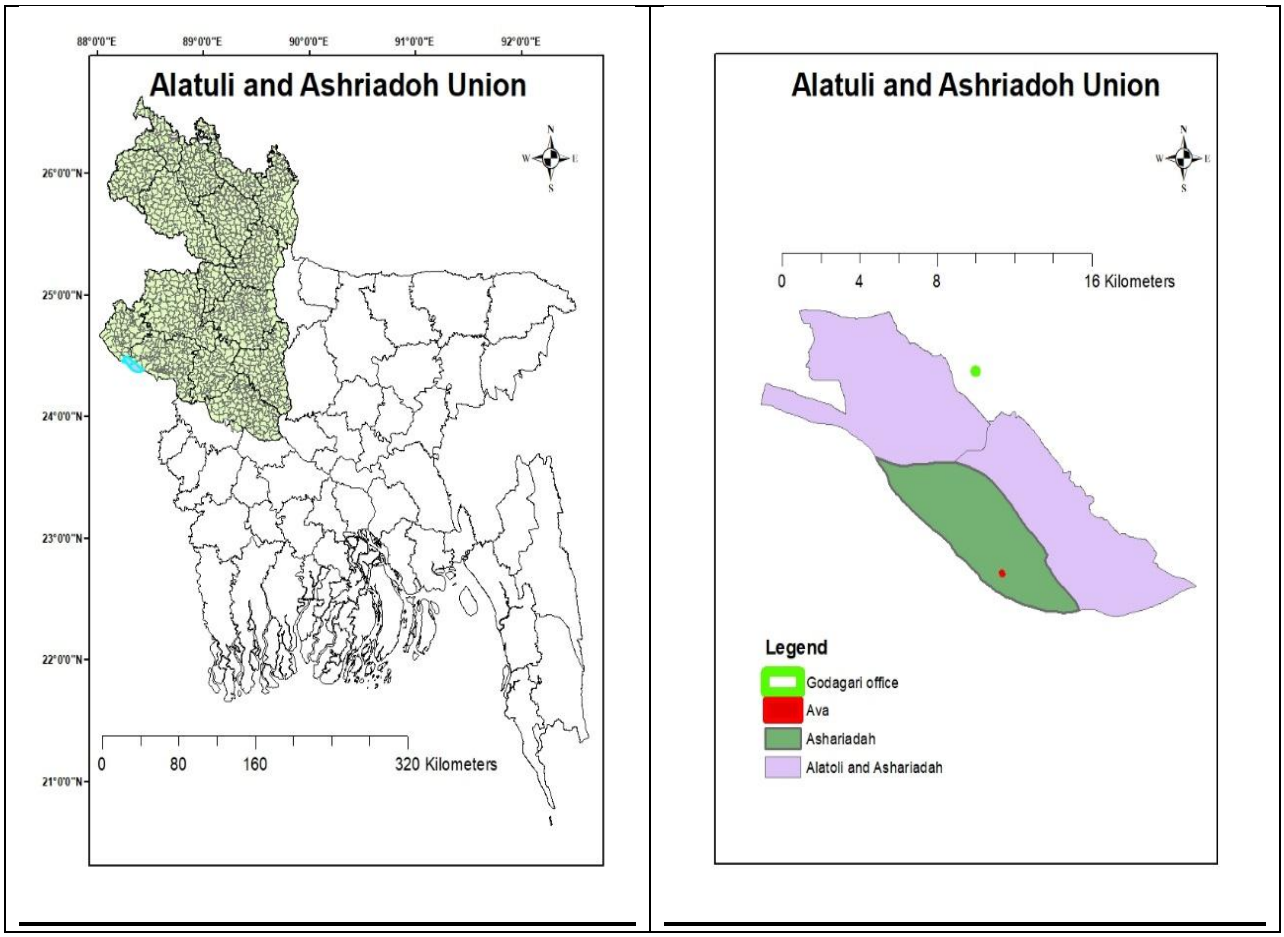


Figure 1: Geographical Location of Char (island) Ashariadah Union in the Map of Bangladesh

There are two major banks for going to island. One is bidirpur and the other is fultola. Based on our observations, bidirpur bank is more stable than fultola. During monsoon season the river crossing distance is 2.7 km and that is around 800m-900m during dry season. Since 2010 to present time, Maximum discharge is 56500 Cubic Meter per Second (m^3/s).

7. Duration: The study is proposed to commence immediately and is scheduled for completion in maximum 4 (Four) months. The study team is expected to mobilize immediately after the sign of contract.

8. Schedule: An indicative schedule for the assignment is shown below:

Task	Month 1				Month 2				Month 3				Month 4			
1.Assessment of Electrification Alternatives and Selection of Preferred Method-Report	■	■														
2.Detailed Feasibility Study (DFS) Based on Selected Electrification method			■	■												
3.ESIA Study Report					■	■	■	■	■	■	■	■				
4.IEE Study Report									■	■	■	■	■	■	■	■
5.Route Survey Report													■	■	■	■
6.LAP Study Report											■	■	■	■		
7.RAP Study Report													■	■	■	■

GENERAL SCOPE OF SERVICES

The overall objective of these studies is to conduct the detailed Feasibility Study of the Project, Initial Environmental Examination (IEE), Environmental and Social Impact Assessment Study (ESIA), Route Survey (RS), Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP) Studies of Electrifying **Char (island) Ashariadaha** by envisaging financial viability, environmental sustainability and social acceptability.

D.(i) Scope of Services for Feasibility Study of electrification in Island (Char) by installing solar power plant with battery energy storage system (BESS):

To complete the overall study of electrification by installing solar power plant with battery energy storage system, the scope of services under this assignment includes the following but not limited to:

1. Preparation of a detailed and a Bankable Feasibility Study;
2. The study should follow the prescribed format of Planning Commission, Government of Bangladesh (Annexure-1);
3. Brief description of the selected site and justification of Site Selection;
4. Assess the technological alternatives/ options and best suitable technology considering the site location and grid system;
5. Civil construction requirement as per BNBC -2020 standard;
6. Major equipment required for installation of the solar PV system;
7. Analyze the solar radiation data of the location by the latest version software;
8. Yield calculation using Metronome latest version simulation software (It includes month wise energy generation, Loss diagram over the whole year, Specific energy yield, Month wise performance ratio etc.);
9. Description and requirement of power evacuation system;
10. Forecast power demand of concerned grid;
11. Analyze the load flow with short circuit current analysis;
12. Detailed technical specifications of each equipment of Power Plant (from PV panel up to transmission line);
13. Detailed technical specifications of the mandatory spare parts;
14. As per PPA, power factor should be 0.85 lagging at the delivery point. Required capacity for reactive support equipment to be determined;
15. Preparation of Bill of Quantity (BOQ) with Cost estimation;
16. Preparing Financial Model (BCR, IRR, NPV etc.) for the project according to the financial arrangement of NESCO;
17. Preparing Economic Model considering Carbon Credit benefit as per SRO of GoB for the project in Economic Appraisal and External Cost and benefit in Economic Appraisal of the Project;
18. Estimated Cost of the Project;
19. Calculation of Levelized Tariff for the Power Purchase Agreement Tenure;
20. Preparation of operating budget;
21. Risk and risk mitigation plan for the project as per the given format of the Feasibility Report;
22. Complete Plant Layout including all equipment dimensions;
23. Complete single l i n e diagram and detailed design description of Power Plant including all protection and metering system;
24. Detailed design of a internal distribution network for providing electrification to the consumers of the island (char);

25. Detailed design of the Solar PV panel mounting structure and
26. Analysis of Geo-Technical, Flood Risk Assessment, Hydro Morphology Analysis and Topographical Survey Reports.

D.(ii) Scope of Services for Feasibility Study of electrification in Island (Char) by Submarine cable including Landing-station through Horizontal Directional Drilling (HDD) process:

To complete the overall study of electrification by Submarine cable including Landing-station through Horizontal Directional Drilling (HDD) process, the scope of services under this assignment includes the following but not limited to:

1. Preparation of a detailed and a Bankable Feasibility Study;
2. The study should follow the prescribed format of Planning Commission, Government of Bangladesh (Annexure-1);
3. Brief description of the selected site and justification of Site Selection;
4. Assess the technological alternatives/ options and best suitable technology considering the site location and grid system;
5. Civil construction requirement as per BNBC -2020 standard;
6. Major equipment required for installation of the Submarine cable including Landing-station through Horizontal Directional Drilling (HDD) process.
7. The Consultant shall identify and recommend the most suitable locations for the landing stations on both sides of the Padma River for submarine cable installation through Horizontal Directional Drilling (HDD), ensuring reliable, safe, and sustainable power supply to Char Ashariadaha.
8. The Consultant shall assess the demographic profile of the project area, determine the existing load demand, and forecast electricity demand up to 2050. Based on the present and projected load requirements, the Consultant shall recommend the appropriate submarine cable capacity, size, specifications, and voltage level to ensure reliable power supply and future compatibility with the distribution network.
9. The Consultant shall carry out route and bathymetric surveys and prepare the design for submarine cable installation through HDD, including route coordinates, cable length, burial depth, water depth, sediment type, obstacles, bank stability, erosion/accretion patterns, bed level changes, highest flood level, landing station locations, and future river interventions.
10. Analysis of soil composition, penetration resistance, sediment layering, bearing capacity, seabed hardness, scouring depth
11. Forecast power demand of concerned grid;
12. Analyze the load flow with short circuit current analysis;
13. Detailed technical specification of each equipment of Power Plant;
14. Detailed technical specifications of the mandatory spare parts;
15. As per PPA, power factor should be 0.85 lagging at the delivery point. Required capacity for reactive support equipment to be determined;
16. Preparation of Bill of Quantity (BOQ) with Cost estimation;
17. Preparing Financial Model (BCR, IRR, NPV etc.) for the project according to the financial arrangement of NESCO;
18. Estimated Cost of the Project;
19. Calculation of Levelized Tariff for the Power Purchase Agreement Tenure;
20. Preparation of operating budget;
21. Risk and risk mitigation plan for the project as per the given format of the Feasibility Report;
22. Complete Plant Layout including all equipment dimensions;

23. Complete single line diagram and detailed design description of Submarine cable **including Landing-station** through Horizontal Directional Drilling (HDD) including all protection and metering system, through hydro-fracture modelling, drilling forces modelling, pullback calculations and calculation of duct installation forces.
24. Detailed design of the Submarine cable **including Landing-station** through Horizontal Directional Drilling (HDD) process
25. Detailed design of a internal distribution network for providing electrification to the consumers of the island (char) and
26. Analysis of Geo-Technical and Topographical Survey Reports.
27. Calculation of Levelized Tariff for the Power Purchase Agreement Tenure;
28. Preparation of operating budget;
29. Risk and risk mitigation plan for the project as per the given format of the Feasibility Report;
30. Complete Electrification Layout including all equipment dimensions;
31. Complete single line diagram and detailed design description of Power Supplying System including all protection and metering system;
32. Collecting, reviewing and Analysis of historical data and maps, satellite image data, Geo-Technical, **Flood Risk Assessment, Hydro Morphology Analysis**, hydraulic, topographic, bathymetric, satellite imageries and study reports.
33. Analyze available data on the cross-sections and flow velocities in the Padma River to understand the prevailing morphological changes of the study area;
34. Analyze the available time-series satellite images of the Padma River to ascertain the bank erosion and accretion.
35. Measure the water level at least one location which covers the spring and neap tide condition and flow velocity in three sections for current profiling.
36. Development of 2D hydrodynamic models to understand the velocity distribution at different locations;
37. Provide an outline drilling methodology suitable to the conditions.
38. Assess the viability of the detailed HDD design through hydro-fracture modelling, drilling forces modelling, pullback calculations and calculation of duct installation forces.
39. Unstable soil (silt, sand, clay), borehole collapse, mud loss, and frac-out (fluid seepage).
40. Determine likely equipment requirements by modelling drilling forces and duct installation forces for the HDD.
41. Provide an indicative method/ program for the HDD works.
42. Provide a high-level risk assessment of the HDD.
43. Bill of Materials, estimates, design, drawing, technical & financial analysis, installation and maintenance costs, lifecycle estimates, financial risks.
44. Recommendation about Optimal installation method of HDD and trench, recommended cable lengths, and other details.
45. Development of Morphological model to understand the bed level changes along the alignment of proposed route.
46. Assessment of present and future morphological condition of Padma River (forecast for at least 50 years)
47. Identify the necessary measure to keep submarine cable fixed in the river
48. Study area should cover about 2 km upstream and 2 km downstream of the proposed route.

D.(iii) Scope of Services for Feasibility Study of electrification in Island (Char) by River Crossing Tower:

To complete the overall study of electrification by River Crossing Tower, the scope of services under this assignment includes the following but not limited to:

1. Preparation of a detailed and a Bankable Feasibility Study;
2. The study should follow the prescribed format of Planning Commission, Government of Bangladesh (Annexure-1);
3. Brief description of the selected site and justification of Site Selection;
4. Assess the technological alternatives/ options and best suitable technology considering the site location and grid system;
5. Civil construction requirement as per BNBC -2020 standard;
6. Major equipment required for installation of the River Crossing Tower.
7. Identify suitable locations in the Padma River for river-crossing towers, including coordinates and route alignment.
8. Evaluate bathymetry, water depth, sediment type, obstacles, slope, bank stability, erosion/accretion patterns, bed level changes, river width, and future interventions.
9. Assess soil composition, sediment layers, penetration resistance, bearing capacity, seabed hardness, and potential risks such as borehole collapse, mud loss, and frac-out.
10. Analyze river cross-sections, flow velocities, and morphological changes.
11. Determine the required number, type (suspension, dead-end, angle, section, anchor, etc.), location, height, weight, materials, steel grade, and design loads (compression, uplift, shear, etc.).
12. Evaluate the feasibility of avoiding tower installation within the main river channel and minimizing foundation risks.
13. Prepare preliminary foundation designs, including pile type, number, depth, diameter, wall thickness, pile cap dimensions, chimney dimensions, and other structural requirements.
14. Recommend conductor and sky wire/earth wire type, material, current carrying capacity, temperature rise characteristics, and ultimate strength.
15. Calculate sag and tension for all spans under no-load and full-load conditions considering conductor weight, wind load, seismic load, operating temperature, and required electrical clearances.
16. Specify insulator and fitting types, materials, tensile strength, electromechanical failing load, withstand voltage, puncture voltage, flashover voltage, and related accessories.
17. Analyze the load flow with short circuit current analysis;
18. Detailed technical specification of each equipment of Distribution Line and Tower;
19. Detailed technical specifications of the mandatory spare parts;
20. As per PPA, power factor should be 0.85 lagging at the delivery point. Required capacity for reactive support equipment to be determined;
21. Preparation of Bill of Quantity (BOQ) with Cost estimation;
22. Preparing Financial Model (BCR, IRR, NPV etc.) for the project according to the financial arrangement of NESCO;
23. Estimated Cost of the Project;
24. Calculation of Levelized Tariff for the Power Purchase Agreement Tenure;
25. Preparation of operating budget;
26. Risk and risk mitigation plan for the project as per the given format of the Feasibility Report;
27. Complete Plant Layout including all equipment dimensions;
28. Complete single line diagram and detailed design description of River Crossing Tower;

29. Detailed design of the River Crossing Tower;
30. Detailed design of a internal distribution network for providing electrification to the consumers of the island (char);
31. Determine demography of the area, determining existing load demand, expected load demand up to 2050. Based on the present and future load demand, proposed capacity of transmission tower conductor/circuit size, specification and voltage level of supplying power in line with present and future distribution network;
32. Provide a bill of materials, installation/construction cost (including all such as design, drawing, supply, installation, testing and commissioning), maintenance costs, lifecycle estimates, and financial risk analysis;
33. Analysis of Geo-Technical and Topographical Survey Reports, Criteria of BIWTA and Water Development Board for minimum ground clearance, navigation clearance, safe river crossing alignment etc. and other necessary conditions for construction of this line;
34. Calculation of Levelized Tariff for the Power Purchase Agreement Tenure;
35. Preparation of operating budget;
36. Risk and risk mitigation plan for the project as per the given format of the Feasibility Report;
37. Complete Electrification Layout including all equipment dimensions;
38. Complete single line diagram and detailed design description of Power Supplying System including all protection and metering system;

D.(iv) Scope of Services for IEE and ESIA Study

The scope of services under this assignment includes the following but not limited to:

1. Initial Environmental Examination (IEE) as per **DoE** Guidelines;
2. Review of relevant literature and existing documents of the proposed Project;
3. Review of legal and policy documents for defining legislative and regulatory considerations of environmental and social aspects;
4. Seismicity analysis based on secondary information;
5. Identify sources of water for fulfilling the requirements of the Project;
6. Site accessibility and transportation of raw materials for the Power Plant and Transmission Line;
7. Prepare an initial level of environmental and socio-economic baseline of the study area covering all project and project facilities in respect to water resources, environmental quality, land and agricultural resources, biological resources including ecosystems and fisheries point of view and socio-economic condition;
8. Identify the important environmental and social components (IESCs) which would be impacted by the project;
9. Conduct a preliminary environmental and social impact assessment against the project interventions and activities;
10. Identify potential project related hazards and natural events;
11. Conduct informal Public Consultation Meetings;
12. Prepare a Preliminary Environmental and Social Management Plan (ESMP);
13. Prepare Terms of Reference (ToR) for the ESIA Study to be appended with the IEE report for the approval of DoE;
14. Prepare an IEE Report which shall form the basis of obtaining location/ site clearance certificate from the DoE. In this regard, necessary documents and presentations are to be performed as per requirement of the DoE;
15. Elaborate Project description and design details including phase- wise project activities;
16. Detail out and firm up the environmental and social baseline information delineated in the IEE level;

17. Assess the requirements of water and its sources in different phases of the Project; In case of ground water, carry out an empirical analysis of GW availability;
18. Carry out a comprehensive environmental and social impact assessment emphasizing beneficial impacts of the Project;
19. Analyze project's induced Risk and Hazard along with the natural events;
20. Prepare an Environmental and Social Management Plan (ESMP) in detail with applicable measures and a tentative EMP implementation budget;
21. Prepare Disaster Impact Assessment (DIA) Report.
22. Prepare a Monitoring Plan including the budget;
23. Prepare a Demolition Plan for the end of project life span;
24. ESIA study should be conducted as per DoE/ADB's Guidelines and
25. Assist the Client in obtaining Environmental Clearance from DoE.

D.(v) Scope of Services for Route Survey of Distribution Line

The scope of services under this assignment includes the following but not limited to:

1. Latest high resolution satellite image will be used to grossly delineate the alignment of the proposed line segment and visualized in map. These maps will be printed in adjustable scale which may be used by Client's Layout Planner for delineating a gross alignment for the proposed line;
2. After delineation of the final route, a detailed ground survey using DGPS/ GPS/RTK and/or Total Station will be conducted to prepare an elevation profile of the route. This profile will be used to fine tune the alignment. The final route will be printed on Mouza sheet with plots;
3. The detailed survey will be conducted for an area of 50 m buffer on either side from the central Line along the route alignment;
4. Compensation Assessment Report of all Building, House, Structure, Tree, Crop etc.

D.(vi) Scope of Services for Land Acquisition Plan (LAP) for Distribution Line throughout the Route

The scope of services under this assignment includes the following but not limited to:

1. Collection of the latest published mouza maps including relevant mouzas covering the proposed project alignment;
2. Scanning of mouza maps and digitizing all plots of the sheets;
3. Conversion of mouza map with plots into GIS format;
4. Collection of high-resolution satellite images;
5. Geo-referencing images through collecting GCP by conducting RTK survey at proposed project alignment and preparing database;
6. Geo-reference mouza plot map according to RTK GCP ortho corrected high resolution satellite images;
7. Collection of both Khatian records Upazila/Union Land Office (Tahsil Office);
8. Prepare land ownership database and link with mouzas plot GIS database and
9. Super impose acquisition boundaries and preparation of acquisition mouza plot maps.

D.(vii) Scope of Services for Resettlement Action Plan (RAP) for Distribution Line

The scope of services under this assignment includes the following but not limited to:

1. Project Conceptualization;
2. Identifying scope of land acquisition and resettlement;

3. Relevant Legal and Policy Framework;
4. Entitlements of compensation;
5. Resettlement budget (Payment of compensation, resettlement, rehabilitation, project management, project administration);
6. Detail survey data (in soft copy) of affected people with appropriate quality of standing trees/crops/lands;
7. Institutional arrangements and
8. Monitoring and evaluation.

PROJECT IMPLEMENTATION SCHEDULE

The study is proposed to commence immediately and is scheduled for completion in maximum 4 (Four) months. The study team is expected to mobilize immediately after the sign of contract.

REPORTS AND DELIVERABLES

1. The Consultant shall report to the Client's nominated representative on all aspects of the assignment, and the deliverables provided shall address in detail all tasks as specified in Section 0. For all reports an executive summary will be included.

2. Unless otherwise agreed, all deliverables and documents will be in and two printed copies shall be provided. Plans and drawings shall be prepared so that they are easily legible in A3 format. All documents (reports and drawings) must be provided in digital format [e.g., Word, Excel, AutoCAD format] and converted into PDF format. Digital copies shall have all links, formulas, and fields active.

3. Reports and their content are set out in the table below:

Table 1: List of reports and deliverables, and their content

All reports shall be submitted according to the following schedule as per contract. The Consultant shall complete the assignment in two phases. Phase-2 activities shall commence only after approval of the Phase-1 Alternative Assessment Report by NESCO.

Phase-1: Alternative Assessment and Selection of Preferred Electrification Option

SL No.	Report Submission Schedule (Days will count from the Contract Signing Date)			
	Name of Report	Inception	Draft Final	Final
		Days	Days	Days
1	Alternative Assessment Report (Assessment of Submarine Cable with HDD, River Crossing Towers and Solar PV+BESS Options)	15	60	75

Phase-2: Detailed Feasibility and Safeguard Studies for the Approved Option

SL No.	Report Submission Schedule (Days will count from the Contract Signing Date)			
	Name of Report	Inception	Draft Final	Final
		Days	Days	Days
2	Detailed Feasibility Study (DFS) of Selected Electrification Option	15	75	120
3	Initial Environmental Examination (IEE)	15	45	75

4	Environmental and Social Impact Assessment (ESIA)	15	75	120
5	Route Survey (RS)	15	45	75
6	Land Acquisition Plan (LAP)	15	75	100
7	Resettlement Action Plan (RAP)	15	75	100

REPORTING REQUIREMENTS

The following Reports in connection with the Detailed Feasibility Study are to be delivered by the consultant to the Client. The assignment is to be completed:

a. An Inception Report is to be prepared and submitted within 15 days from the date of commencement of the study;
b. Draft Route Survey Report is to be prepared and submitted within 45 days from the date of commencement of the study;
c. Final Route Survey Report is to be prepared and submitted within 75 days from the date of commencement of the study;
d. Draft Detailed Feasibility Study Report including Detailed technical specification of each equipment of the Power Plant (from PV panel up to transmission line), Bill of Quantities (BoQ) with cost estimation, benefits, annual income, Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost Ratio (BCR), Complete Plant layout are to be prepared and submitted at the end of 75 days from the date of commencement of the study;
e. Final Detailed Feasibility Study Report including Detailed technical specification of each equipment of the power plant (from PV panel up to transmission line), BoQ with cost estimation, benefits, annual income, NPV, IRR, BCR, Complete Plant layout are to be prepared and submitted at the end of 120 days from the date of commencement of the study;
f. Draft Land Acquisition Plan (LAP) and Draft Resettlement Action Plan (RAP) are to be submitted at the end of 75 days from the date of the commencement of the study;
g. Final Land Acquisition Plan (LAP) and Final Resettlement Action Plan (RAP) are to be submitted at the end of 100 days from the date of the commencement of the study;
h. Draft Initial Environmental Examination (IEE) Study Report is to be submitted at the end of 45 days from the date of commencement of the study;
i. Final IEE Study Report is to be submitted at the end of 75 days from the date of commencement of the study;
j. Draft Environmental and Social Impact Assessment (ESIA) Study Report is to be submitted at the end of 75 days from the date of commencement of the study;
k. Final ESIA Study Report is to be submitted at the end of 120 days from the date of the commencement of the study;
l. All draft Reports and Final Reports are to be submitted in 2 (two) and 5 (five) sets respectively in original with a soft copy;
m. All reports must be prepared as per Bangladesh and the ADB standards and acceptable to the Client.

4. In addition to the reports and other deliverables identified above, the Consultant will prepare and maintain full and proper records of all meetings and discussions.

PAYMENT SCHEDULE

Payment shall be made upon submission and acceptance of the deliverables by the Client. The percentage of the Lump-Sum Contract Price shall be paid according to the following schedule.

Phase-1: Alternative Assessment and Selection of Preferred Electrification Method

SL No.	Payment Particulars	Total Weight (%)	Inception Report	Draft Report	Final Report
			% of weight factor		
1	Alternative Assessment Report	20	10	50	40

Phase-2: Detailed Feasibility and Safeguard Studies for the Approved Method

SL No.	Payment Particulars	Total Weight (%)	Inception Report	Draft Report	Final Report
			% of weight factor		
2	Detailed Feasibility Study (DFS) of Selected Electrification Option	30	10	50	40
3	ESIA Study Report	15	10	50	40
4	IEE Study Report	10	10	50	40
5	Route Survey Report	10	10	50	40
6	LAP Study Report	7.5	10	50	40
7	RAP Study Report	7.5	10	50	40
Total		**80**	**10**	**50**	**40**

Note: All Inception, Draft, and Final Reports shall be submitted along with a PowerPoint Presentation at NESCO Head Office. Phase-2 activities shall commence only after NESCO's approval of the Alternative Assessment Report and selection of the preferred electrification option.

PAYMENT TERMS

The prices shall be quoted either in the currency of the Employer's home country (Bangladesh Taka or BDT), or in United States Dollar (USD).

- **Currency:** A Bidder expecting to incur a portion of its expenditures in the performance of the Contract in more than one currency, and wishing to be paid accordingly, shall so indicate in the Schedule of Prices and the Letter of Bid.
- **Evaluation Currency:** The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: United States Dollar (USD).

The source of the selling exchange rate shall be: Bangladesh Bank Published in their website: https://www.bb.org.bd/econdata/exchangerate.php

The date for the selling exchange rate shall be 28 days prior to the deadline for the submission of the bids.

- **Method:** Bank transfer to the consultant's designated account in accordance with ADB's Direct payment procedure described in the Loan Disbursement Handbook found on https://www.adb.org/documents/loan-disbursement-handbook
- **Timeline:** Payments will be processed within 30 days of invoice approval.

Note : If the project duration is extended, the preparation of the report shall be considered included within the scope of this contract without increasing the contract value.

TEAM COMPOSITION AND QUALIFICATION REQUIREMENTS

The proposed study may require 24.75 person-months of local professional input.

CONSULTANT TEAM REQUIREMENTS

5. The Consultant shall retain personnel, with the required minimum qualifications, for the tasks described in these TOR, covering the disciplines mentioned in Table 3.

6. The Consultant shall prepare a Deployment Schedule of their experts (both key and non-key) for the entire period of the assignment, demonstrating how deliverables will be submitted on-time.

7. It is expected that during the discharge of its duties the Consultant will apply international best practice in all fields including, but not limited to, the areas of environmental, health and safety, labor and social safeguards best practice and the promotion of gender equality.

8. All key personnel shall be fluent in English and be fully computer literate.

QUALIFICATION OF THE CONSULTANR FIRM

To engage the expertise, a firm must meet the following criteria:

i. Certificate of incorporation/valid up-to-date trade license.
ii. 5 years of overall experience, along with a successful contract completion certificate.
iii. Demonstrated experience in implementing safeguard instruments (IEE, EMP, EMoP, SMP, RAP) in projects funded by multilateral development banks, preferably ADB.
iv. At least two similar work experiences in the power sector specifically in distribution, transmission, or generation projects involving safeguard compliance.
v. Consultants to be engaged under the firm must have the qualification mentioned in this TOR
vi. The farm & consultant to be engaged under the firm shall not be sanctioned by ADB & NESCO or any national regulatory authority.
vii. Commitment to ethical standards, transparency, and adherence to safeguard obligations, including prevention of child labor, forced labor, and gender-based violence.

KEY & NON-KEY EXPERT REQUIREMENTS

9. The estimated consultants' staffing requirements are presented on the table below.

Table-2: List of Key & Non-Key Professionals

Sl. No	Position	Category	Nos.	Month	Person-month
	Key Expert				
1	Team Leader	National	1	3	3
2	Senior Design Engineer (River Crossing Tower)	National	1	1	1
3	Design Engineer (Submarine Cable Crossing)	National	1	1	1
4	Design Engineer (RTW-River Training Work)	National	1	0.75	0.75
5	Electrical Engineer (Solar Power Plant)	National	1	1	1
6	Structural Expert	International	1	0.75	0.75
7	Horizontal Directional Drilling (HDD) Expert	National	1	1	1
8	Substation and Transmission/ Distribution Line Engineer	National	1	1.5	1.5
9	Economic & Financial Expert	National	1	1	1
10	Environmental Expert/EIA Specialist	National	1	1	1
11	Hydrologist	National	1	1	1
12	Route Survey Expert	National	1	1	1
	Non- Key Expert				
13	Morphological Modelling Specialist	National	1	1	1
14	Geotechnical Engineer	National	1	0.5	0.5
15	Land Acquisition & Resettlement Specialist	National	1	1	1
16	Sociologist	National	1	0.5	0.5
17	Agriculture Expert	National	1	0.5	0.5
18	Fisheries Expert	National	1	0.5	0.5
19	RS/GIS Specialist	National	1	1	1
20	Data Analyst/ Survey Specialist	National	1	2.5	2.5
21	Disaster Management Specialist	National	1	0.75	0.75
22	Biodiversity/ Ecologist	International	1	0.75	0.75
23	AutoCAD Expert	National	1	1.75	1.75
			Total	**24.75**	**24.75**

10. The qualifications and experience required for key & Non-Key experts are given in the tables below.

Table 2: Requirements for Key & Non-Key Experts

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
Key-Expert			
1	Team Leader	Qualification: 1) He/she should have at least bachelor's in civil engineering. Higher degree in same field will be an advantage. 2) He/she should have worked experience of over 15 years in Sub-marine cable installation/river crossing tower installation. 20 years' experience will carry maximum credit. 3) Working experience at least one Similar Project as Team Leader. 4) Experience of working in more than 1 (one) developing countries will be preffered . Responsibility: His/her major responsibilities shall include but not necessarily be limited to the following: 1) Oversee the assignment and the consultant team and act as the team's point of contact with NESCO. 2) Review all scope of services; manage the project including administration procedures for the implementation of the project. 3) Prepare the technical specifications; choose the best technology options considering the site location and grid system; Prepare the Project implementation schedules, and drawings for bidding of the Power Plant on a turn-key basis. 4) Advice and assist NESCO to develop and maintain a project quality assurance plan. 5) Prepare the sample Testing Procedures for Major Equipment of Power Supplying System. 6) Prepare detailed technical specifications of the mandatory spare parts. 7) Review of hazard evaluation of Power Supplying System. 8) Prepare the detailed description of Major equipment required for installation of Power Supplying System 9) Evaluate the technical, economic, environmental, operational, and reliability aspects of the proposed electrification methods (i) Submarine Cable through	3

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		HDD, or (ii) River Crossing Tower, or (iii) Solar PV with BESS, based on life-cycle cost, reliability, sustainability, ease of operation and maintenance, and future load growth requirements. 10) Conduct other duties and responsibilities as required by the ToR. 11) Attend meetings with the client as and when required. 12) Preparation of the reports at different stages of the study. 13) Others as necessary.	
2	Senior Design Engineer (River Crossing Tower)	<u>Qualification:</u> 1) Minimum of Bachelor's (or equivalent) degree in Civil Engineering/Water Resources Engineering. A postgraduate degree in a relevant field will be preferred. 2) Minimum 15 years of professional experience in the water sector, including at least 10 years of experience in hydraulic structure design and bank protection design. 3) Prior experience in designing bank protection works will be considered an added advantage. 4) Experience of working in more than 1 (one) developing countries will be preffered . <u>Responsibility:</u> His/her major responsibilities shall include but not necessarily be limited to the following: 5) Establish the criteria for hydraulic design of the proposed protective works using different design guidelines; 6) Formulate and design of the alternative structures recommended for the river training works. 7) Designing of protection work, different drainage structures, and road cum embankment; 8) Preparation of cost estimate of the structures based on recent actual schedule of rates including annual expenditure schedules 9) Comparison of the alternatives and find out a suitable solution.	1

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		10) Developed design specifications and drawing; 11) Finalize cost-estimate of different protective measures; 12) Participation in meetings with NESCO as and when required 13) Preparation of different reports as required for the proposed study. 14) Attending meeting as and where required; 15) Maintain liaison with required other agencies; 16) Assisting team leader in co-ordinating the study.	
3	Design Engineer (Submarine Cable Crossing)	<u>Qualification:</u> 1) Minimum of Bachelor's (B.Sc.) degree in Civil Engineering/Water Resources Engineering or a related discipline. A master's degree in a relevant field will be preferred. 2) Minimum 15 years of professional experience in the design and analysis of hydraulic and marine structures, including at least 05 years of specific experience in submarine cable or pipeline crossing design. 3) Prior experience in relevant projects will be considered an added advantage. 4) Experience of working in more than 1 (one) developing countries will be preffered . <u>Responsibility:</u> His/her major responsibilities shall include but not necessarily be limited to the following: 5) Review and evaluate alignment, design drawings, and technical specifications for submarine cable crossings. 6) Prepare detailed design plans, including cable routing, foundation design for structures, and protection measures. 7) Conduct hydrodynamic and geotechnical assessments of the site to support safe and efficient installation. 8) Provide technical guidance on materials, construction methods, and environmental mitigation measures. 9) Ensure designs comply with national and international standards, codes, and guidelines.	1

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		10) Coordinate with multidisciplinary teams including civil, geotechnical, and environmental specialists. 11) Prepare technical reports, design documentation, and as-built records for submission to relevant authorities. 12) Attending meeting as and where required; 13) Maintain liaison with required other agencies; 14) Assisting team leader in co-ordinating the study	
4	Design Engineer (RTW-River training Works)	<u>Qualification:</u> 1) Minimum of Bachelor's (or equivalent) degree in Civil Engineering/Water Resources Engineering; a master's degree in a relevant field will be preferred. 2) Minimum 15 years of professional experience in the water sector, including at least 10 years of experience in hydraulic structure design and bank protection design. 3) Previous experience in designing bank protection works will be considered an advantage. 4) Experience of working in more than 1 (one) developing countries will be preffered . <u>Responsibility:</u> His/her major responsibilities shall include but not necessarily be limited to the following: 5) Establish the criteria for hydraulic design of the proposed protective works using different design guidelines; 6) Formulate and design of the alternative structures recommended for the river training works. 7) Designing of protection work, different drainage structures, and road cum embankment; 8) Preparation of cost estimate of the structures based on recent actual schedule of rates including annual expenditure schedules 9) Comparison of the alternatives and find out a suitable solution. 10) Developed design specifications and drawing; 11) Finalize cost estimate of different protective measures; 12) Participation in meetings with NESCO as and	0.75

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		when required 13) Preparation of different reports as required for the proposed study. 14) Attending meeting as and where required; 15) Maintain liaison with required other agencies; 16) Assisting team leader in co-ordinating the study.	
5	Electrical Engineer (Solar Power Plant)	<u>Qualification:</u> 1) Minimum of Bachelor's (B.Sc.) degree in Electrical/Electrical & Electronic Engineering from any recognized University. A master's degree in a relevant field will be preferred. 2) Minimum 10 years of professional experience in the power sector, including at least 5 years of specific experience in the design, installation, operation, or maintenance of solar power plants. 3) Sound knowledge of solar PV system design, inverters, grid integration, and electrical protection systems and familiarity with national and international standards for solar power systems will be preferred. 4) Experience of working in more than 1 (one) developing countries will be preffered . <u>Responsibility:</u> His/her major responsibilities shall include but not necessarily be limited to the following: 5) Prepare the technical specifications; choose the best technology options considering the site location and grid system; Prepare the Project implementation schedules, and drawings for bidding of the Power Plant on a turn-key basis. 6) Prepare the sample Testing Procedures for plant Major Equipment. 7) Review of hazard evaluation of Power Plant. 8) Prepare the detailed description of Major equipment required for installation of the solar PV system. 9) Analysis of the solar radiation data of the location. 10) Yield calculation using Metronome latest version simulation software (It includes month wise energy generation, Loss diagram over the whole year, Specific energy yield, Month wise performance ratio etc.). 11) Prepare detailed technical specifications of the mandatory spare parts.	1

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		12) Prepare the Solar PV panel mountain structure design. 13) Conduct other duties and responsibilities as required by the ToR. 14) Attending meeting as and where required; 15) Maintain liaison with required other agencies; 16) Assisting team leader in co-ordinating the study.	
6	Structural Expert	<u>Qualification:</u> 1) He/she shall have at least a B.Sc. in Civil Engineering. Higher degrees in Structural Engineering will carry maximum credit. 2) He/she shall have experience of a similar nature of work for minimum 8 years. 10 years of experience in similar nature of works will carry maximum credit. 3) Experience of working in more than 1 (one) developing countries will be preffered . <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Preparing the Design and Layout of the Plant. 2) Shall carry out all Civil and Geotechnical activities. 3) Interpret the environmental consequences of Solar PV Power Plant. 4) Determine the availability of land for the ultimate capacity of the power stations. 5) Find out the land quality and carry out the Geotechnical and Topographic survey. 6) Identify all technical requirements/parameters to be specified by NESCO required as part of the development of the Solar PV Power plant. 7) Preliminary idea of structural design of different components of the power plant. 8) Preparation of specification and cost of estimate (if required). 9) Assist the Team Leader in preparation of the reports at different stages of the study. 10) Suggest foundation for Tower and Bay Infrastructure. 11) Attending to the meeting and when required by the client. 12) Others as necessary.	0.75
7	Horizontal Directional	<u>Qualification:</u>	1

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
	Drilling (HDD) Expert	1) Minimum of bachelor's degree in civil/Geotechnical/Mechanical Engineering or related field; a Master's degree in a relevant discipline will be preferred. 2) Minimum 12 years of professional experience, including at least 05 years of specific experience in Horizontal Directional Drilling (HDD) design and execution for river crossings, pipelines, or cable installations. 3) Sound knowledge of drilling equipment, mud systems, ground condition assessment, and international standards for HDD operations. <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Review and evaluate alignment, design drawings, and technical specifications for HDD works related to river crossings and submarine cable installations; 2) Prepare detailed HDD design plans, including bore profiles, drilling fluid management, and equipment selection; 3) Assess subsurface conditions and recommend appropriate drilling methods and materials; 4) Coordinate with geotechnical, structural, and environmental teams to address site-specific challenges; 5) Prepare technical reports, progress updates, and as-built documentation for HDD activities 6) Assist team leader to prepare cost estimation. 7) Liaising with relevant professional staff. 8) Attend meetings with team leader as and when required by the client. 9) Assist the Team Leader in preparation of the reports at different stages of the study. 10) Others as necessary.	
8	Substation and Transmission/Distribution Line Engineer (Electrical)	<u>Qualification:</u> 1) He/she shall be at least B.Sc. in Electrical Engineering; master's in electrical engineering will carry maximum credit.	1.5

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		2) He/she shall have experience of a similar nature of work for minimum 8 years. 10 years of experience in similar nature of works will carry maximum credit. 3) He/she must have knowledge and work experience in power plant. He/she should have fair idea about the power plant set up. He/she must have proven records of leading and working with multi-disciplinary and multi-cultural teams. 4) Previous experience in relevant projects will be preferred <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Review of the Power System Network Analysis Report. 2) Preparing and studying technical drawings and specifications of electrical systems. 3) Prepare SLD and Layout of Bay extension facilities. 4) Installation and operations conform to standards and customer requirements. 5) Finalize locations of river crossing towers and anchor towers considering wind span, weight span, conductor sag tension and other design parameters. 6) Providing technical advice on the study. 7) All activities regarding protection and automation. 8) Assist team leader to prepare cost estimation. 9) Liaising with relevant professional staff. 10) Attend meetings with team leader as and when required by the client. 11) Assist the Team Leader in preparation of the reports at different stages of the study. 12) Others as necessary.	
9	Economic & Financial Expert	<u>Qualification:</u> 1) He/she should have a master's degree in economics / finance. Higher Professional degree will carry the maximum limit. 2) He/she shall have experience of 10 years in similar nature works. 15 years of experience in similar nature of works will carry maximum credit. 3) He/she should have experience in Financial and Economic study related to Solar PV Power Plant	1

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		/Submarine cable installation/ River crossing Tower installation/ Power transmission infrastructure and on macro and microeconomics, regional planning, assessment of economic potentials of regional development plan, formulation of sectorial polices and strategies for Bangladesh. <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Perform detail-feasibility level economic and financial analysis (IRR & EIRR). 2) Examine and evaluate the available data related to the socio-economic condition of the study, magnitude and extents of the people sufferings from the proposed power plant. 3) Assist the Team Leader in preparation of the reports at different stages of the study. 4) He/she shall have to calculate the project benefit, annual income, Internal Rate of Return, benefit-cost ratio. 5) Attending meetings as and where required; 6) Maintain liaison with required other agencies; 7) Assisting team leader in co-ordinating the study.	
10	Environmental Expert/EIA Specialist	<u>Qualification:</u> 1) At least B.Sc. in Environmental Engineering or Environmental Science. Higher degrees in the same field will carry the maximum limit. 2) He/she shall have experience of 10 years in environmental and social safeguard. 15 years of experience in similar nature of works will carry maximum credit. 3) Experience as safeguard specialist of at least one 15 MW of Solar PV Power Plant Projects or in a relevant field will be preferred. 4) Experience of working in more than 1 (one) developing countries. 5) The candidate should have formal training in conducting Environmental Impact Assessment (EIA).	1

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		6) Minimum 15 years of professional experience, preferably in relevant projects and in the field of Environmental Impact Assessment (EIA). <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Interpret the environmental consequences of Electrifying the island (char). 2) Assess environmental impacts and mitigation measures. 3) Attend meetings with the client as and when required. 4) Preparation of the report at different stages of the study. 5) Contribute in developing environmental management plan including mitigation plan. 6) Make inventory of present environmental situation; 7) Carry out Environmental Impact Assessment; 8) Preparation of Environmental Monitoring & Management Plan; 9) Assist in preparation of Final Report with EIA. 10) Other as necessary. 11) Attending meeting as and where required; 12) Maintain liaison with required other agencies; 13) Assisting team leader in co-ordinating the study.	
11	Hydrologist/ Hydro-dynamic Modeler/ Flood Modeler	<u>Qualification:</u> 1) Minimum of Master's (or equivalent) degree in Geology/Civil Engineering/Water Resources Engineering or relevant field. 2) Minimum 15 years of professional experience in hydrological analysis and hydrological modelling. 3) Previous experience on relevant projects will be considered an advantage. <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Review of the river systems and available data; 2) Development of hydrological and hydrodynamic model for river systems; 3) Simulate hydrological and hydrodynamic conditions of rivers; 4) Establish design parameters from simulation results;	1

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		5) Analysis simulation results; 6) Contribute in preparing the reports of the study and workshop materials. 7) Attending meeting as and where required; 8) Maintain liaison with required other agencies; 9) Assisting team leader in co-ordinating the study.	
12	Route Survey Specialist	Qualification: 1) He/she should have B.Sc. Engineering (Civil). Higher degrees in the same field will be carried the maximum limit. 2) Working Experience of related field at least 5 years. 8 years of experience in similar nature of works will carry maximum credit. Responsibilities: His/her tasks and responsibilities shall include but are not limited to: 1) Understanding the project data need and formulate/ plan field data collection program with proper equipment and techniques. 2) Lead/guide and advise research assistant/surveyors and the survey team in the field to set up equipment, measuring different instruments requirements etc. 3) Preliminary Route Identification and finalize with the consent of the Client. Select the Route for the 8 km overhead Transmission/Distribution Line based on the presence of less settlement, less vegetation coverage, less river or canal crossing etc.	1
Non-Key Expert			
13	Morphological Modelling Specialist	Qualification: 1) Master's degree in civil / water resources engineering/ Hydro-informatics. 2) Minimum of 15 years of professional experience. 3) At least 10 years' experience in hydrodynamic, sediment transport and morphological modelling. Previous experience in similar working environment will be preferred. Responsibilities: His/her tasks and responsibilities shall include but are not limited to: 1) Guide the modelling team in updating the available	1

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		morphological model and simulating flood events; 2) Assess the medium to long-term morphological changes and sedimentation/erosion rate, vulnerability of riverbanks and the existing RTWs 3) Participation in field activities of the study 4) Contribute to preparing different reports 5) Maintain liaison with the Client. 6) Assist Team Leader in the interaction meetings and preparing reports. 7) Attending meeting as and where required; 8) Maintain liaison with required other agencies; 9) Assisting team leader in co-ordinating the study	
14	Geotechnical Engineer	<u>Qualification:</u> 1) Bachelor's (B.Sc.) degree in Civil Engineering from any recognized University, with preference given to candidates holding higher degrees in relevant fields. 2) Minimum 10 years of total professional experience, including at least 05 years of specific experience in the relevant field. <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Lead and coordinate the consulting team across all activities, including work plan, borehole layout and ensure timely delivery of outputs. 2) Supervise SPT, boreholes, sampling, depth criteria. 3) Assign tests, check quality, ensure ASTM standards. 4) Manage dual sample verification and dispute resolution. 5) Analyse data, prepare geotechnical reports with recommendations. 6) Attending meeting as and where required; 7) Maintain liaison with required other agencies; 8) Assisting team leader in co-ordinating the study.	0.5
15	Land Acquisition & Resettlement Specialist	<u>Qualification:</u> 1) He/she should have a B.Sc. in Statistics or Civil Engineering. Higher degrees in the same field will be carried the maximum limit.	1

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		2) Working experience is at least 5 years in relevant field. 8 years of experience in similar nature of works will carry maximum credit. Responsibilities: His/her tasks and responsibilities shall include but are not limited to: 1) Review of Land Acquisition Plan (LAP) and relevant documents for the project. 2) Collect necessary preliminary data and information using Inventory of Losses (IOL) Survey, Socio-Economic Survey (SES), and Property Valuation Survey (PVS) for analyzing the impacts 3) Conduct necessary consultation meeting with the stakeholders and documentation of records and feedback. 4) Prepare entitlement policy and eligibility criteria for the affected households/ persons in consultation with the Client. 5) Prepare RAP for the affected households/units. 6) Demarcation of the existing acquired land/disputed land (if any) on CS/RS map under BIP project; 7) Analysing and interpreting the data on CS/RS map; 8) Attending meeting as and where required; 9) Maintain liaison with required other agencies; 10) Assisting team leader in co-ordinating the study	
16	Sociologist	Qualification: 1) He/she should have a B.S.S (Hons) in Sociology or Social Welfare. Higher degrees in the same field will carry the maximum limit. 2) Working experience at least 5 years in the field of Environmental and Social Impact Assessment Study. 8 years of experience in similar nature of works will carry maximum credit. 3) He/she should have at least 15 years' experience in sociological activities & field survey, i.e. interaction with the stakeholders, holding Focus Group Discussion (FGD), Target Group Discussion (TGD) and workshops/seminars at field level to find out the desired goal of the study and to disseminate the results of the study. Responsibilities: His/her tasks and responsibilities shall include but are not limited to:	0.5

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		1) Designing and developing methodology along with collection, completion and analysis of data related to social activities in and around the Project site and along the transmission line route. 2) Identifying and assessing the possible positive and negative impacts in settlements and homesteads due to installation of the power plant. 3) Recommending measures to offset negative Impacts and will assist team leader in preparing the IEE report. 4) Coordinate with the team leader and others member of the team. Assist the study team in holding seminars and workshops. 5) Intensive Field visit for collecting views of the local people, their present socio-economic activities and problems including present situation in the vicinity of Project Area; 6) Holding interaction meeting with the stakeholders at field level holding Focus Group Discussion (FGD), Target Group Discussion (TGD) and workshops/seminars at field level to find out the desired goal of the study and to disseminate the results. 7) Find out the conflicting issues, conduct motivational work among the stakeholders against any negative issue and suggest mitigation measures.	
17	Agriculture Expert	<u>Qualification:</u> 1) He/she should have B.Sc. in Agriculture/ Agricultural Eng. Higher degree in the same field will be carried the maximum limit. 2) Working Experience of related field at least 8 years. 10 years of experience in similar nature of works will carry maximum credit. 3) Previous experience on similar projects will be preferred. <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Crop Area Identification. 2) Cropping pattern and Crop yield assessment. 3) Identifying potential impacts and crop loss (if any).	0.5

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		4) Give necessary measures against the potential impacts. 5) Collecting historical data on Fisheries for generating the future without project (FWOP) condition and compare the same with the future with Project (FWIP). 6) Monitoring the impact of fish production and its diversity during the project implementation and suggesting possible mitigation measures. 7) Suggesting Environmental Management Plan. Asses the environmental impact and mitigation measures and prepare IEE Reports. 8) Contributing to report preparation. 9) Providing information about technical activities and other technical things to the team members. 10) Coordinating with the team leader as well as other team members. 11) Other related work as directed by the team leader.	
18	Fisheries Expert	<u>Qualification:</u> 1) Minimum of Master's (or equivalent) degree in Fisheries. 2) Minimum 12 years of professional experience in fisheries appraisal of Water Resources Sector projects. 3) Previous experience on similar projects will be preferred. <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Studying the possible impact for the construction of overhead transmission towers and submarine cable installation; 2) Preparation of Fisheries Management Plan if necessary; 3) Miscellaneous task as and when required; 4) Fisheries management implementation work schedule; 5) Also, he/she will support the Environmental and	0.5

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		Social Impact Assessment team; 6) Assist team leader to prepare cost estimation. 7) Liaising with relevant professional staff. 8) Attend meetings with team leader as and when required by the client. 9) Assist the Team Leader in preparation of the reports at different stages of the study. 10) Others as necessary.	
19	RS/GIS Specialist	<u>Qualification:</u> 1) He/she shall have at least a 4-years B.Sc. (Hons) in Geography /Environmental Sciences or bachelor's degree in civil engineering. Higher degree in same field will carry the maximum limit. 2) Minimum 08 years of professional experience in GIS-based analysis and mapping, including preparation of GIS coverages, contour maps, and digital elevation models (DEM). 3) 8 years of experience in similar nature of works will carry maximum credit. <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Support study team by preparing maps and providing spatial information on demand. 2) Identifying special topographical features. 3) Prepare all types of maps and drawings required for the study 4) Extracting land use information from satellite images. 5) Conducting spatial analysis using collected field and environmental data. 6) Geo-referencing of the Mouzas through field survey of Ground Control Points (CCPs). 7) Ensuring the accuracy of Mouza maps through geometric correction. 8) Processing of high-resolution images to get the accurate area for the land acquisition and 9) Preparation of Land Acquisition Plan (LAP) Map showing affected area, part or full plots, class of land and ownership of land in the proposed acquisition area.	1
20	Data Analyst/Survey	<u>Qualification:</u>	2.5

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
	Specialist	1) He/she should have a Diploma in Engineering (Civil) or Survey. Higher degrees will be carry the maximum limit. 2) He/she should have at least 5 years' experience in analysis of different types of data including sediment, discharge, water level, flow velocity etc. Previous experience in similar environment will be preferred. 8 years of experience in similar nature of works will carry maximum credit. <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Establish Benchmark Point. 2) Ensure vertical accuracy. 3) Assist Digital Survey Expert in field as well as in data processing. 4) Digital survey by using total station. 5) Data management and processing. 6) Quality control and accuracy assessment. 7) Carrying out survey work. 8) Responsible for the collection of field data and secondary sources data from different organizations; 9) Ensure data quality and prepare data needed for hydrological and morphological modelling and analysis; 10) Attend meetings with team leader as and when required by the client. 11) Assist the Team Leader in preparation of the reports at different stages of the study. 12) Others as necessary.	
21	Disaster Management Specialist	<u>Qualification:</u> 1) He/she should have B. Com (Hons) in Management/Bachelor in any Engineering degree /Disaster Science and Climate Resilience. Masters in Disaster Management will carry the maximum limit. 2) He/she shall have experience of 5 years in similar works of nature. 8 years of experience in similar nature of works will carry maximum credit. <u>Responsibilities:</u>	0.75

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		His/her tasks and responsibilities shall include but are not limited to: 1) Natural Hazard Analysis. 2) Risk Identification and suggesting necessary Measures against the natural hazard. 3) Assessing the threat from project hazard. 4) Risk analysis of any accidents or if any leakage takes place. 5) Hazard and risk assessment. 6) Risk Modeling. 7) Preparing risk management plan. 8) Anticipate, identify and evaluate hazardous conditions and practices. 9) Perform /review hazard assessment/accident investigations and develop corrective actions/measures to mitigate and control job hazards. 10) Review and analyze injury frequency records, causation trends, mitigation options for reducing injury frequency. 11) Perform hazard assessment and define job safety requirement in work permits. 12) Review and audit the safety and health programs for adequacy, compliance and effectiveness. 13) Serve as a member of the emergency response team. 14) Contributing to report preparation. 15) Providing information about technical activities and other technical things to the team members. 16) Coordinating with the Team Leader as well as other team members. 17) Other related works as directed by the Team Leader.	
22	Biodiversity Specialist/ Ecologist	<u>Qualification:</u> 1) He/she should have a 4-years B.Sc. (Hons) in Botany. Higher degrees will carry the maximum limit. 2) Working Experience of related field at least 5 years. 8 years of experience in similar nature of works will carry maximum credit. <u>Responsibilities:</u>	0.75

No.	Position	Education and Qualification Requirements	Expected Inputs (months)
		His/her tasks and responsibilities shall include but are not limited to: 1) Designing and developing methodology along with collection, completion and analysis of data related to biological resources. 2) Establishing baseline conditions for ecosystem resources. 3) Identifying and assessing the possible positive and negative impacts on flora and fauna due to the proposed project. 4) Recommending measures to offset negative impacts and will assist team leader interpretation of data. 5) Greenbelt planning and design. 6) Miscellaneous task as and when required. 7) Contributing to report preparation. 8) Providing information about technical activities and other technical things to the team members. 9) Coordinating with the team leader as well as other team members.	
23	AutoCAD Expert	<u>Qualification:</u> 1) He/she shall have at least a 4-years Diploma in Civil/Mechanical/Electrical Engineering. Higher degrees in same field will be carried to the maximum limit. 2) Engineering with minimum 5 years' working experience in the field of Auto-CAD. Extensive experience is required with Auto-CAD, ARC/INFO, and Arc View Software He/she must have proven records of leading and working with multi-disciplinary team. 8 years of experience in similar nature of works will carry maximum credit. <u>Responsibilities:</u> His/her tasks and responsibilities shall include but are not limited to: 1) Prepare all types of maps and drawings required for the study. 2) Shall have close co-ordination with all other members of the team for preparation of the maps and drawings of the study. 3) Others as necessary.	1.75
		Total	24.75

11.Curriculum Vitae (CV) must be provided with the Consultant's proposal for all key expert and Non key Expert positions.

12.Administrative and clerical support personnel, drivers and other support personnel are to be provided as required, and the cost of these is to be clearly included in the Consultant's cost proposals.

CLIENT'S INPUT AND COUNTERPART PERSONNEL

The consultant shall work under the direct supervision of the Superintending Engineer, Project Planning, NESCO. The concerned offices of NESCO shall assist the study team as required. In case of any unforeseen events, be it in terms of physical or social obstacles at field levels; the concerned field offices of the NESCO, will take initiatives to solve it and ensure good working environment.

13. Existing data: *The Client shall make existing reports and data related to the Project available to the Consultant. The Client will consider making available other data and reports necessary for executing the assignment as and if requested by the Consultant*.

14.Office facilities: ***No office facilities will be made available to the Consultant.***

15.The Consultant shall be responsible for arranging and paying for its own accommodation, vehicles and equipment. Unless otherwise stated by the Client, the Consultant will be responsible for organizing its own transportation for site visits.

*16.*Public consultations*: All costs related to public consultations shall be borne by the Consultant. NESCO shall provide necessary support and coordination for arranging such consultations.*

17.Security: *The Consultant shall be responsible for arranging and bearing the cost of security for its personnel, equipment, and vehicles during field surveys and investigations. NESCO shall provide necessary coordination with local administration, law enforcement agencies, and other relevant stakeholders to facilitate safe access to the Project area whenever required.*

18.Counterpart personnel: *No counterpart personnel will be assigned by NESCO for this assignment. The Consultant shall be responsible for carrying out the services with its own personnel and resources. NESCO will provide necessary coordination and available information, as required.*

19. Assistance and exemptions: *The Consultant shall be solely responsible for obtaining and maintaining all necessary work permits, visas, residence permits, customs clearances, professional registrations, and other statutory approvals required for its personnel. Any fees, charges, taxes, duties, or expenses associated with such approvals shall be borne by the Consultant.*

20.The service provider will arrange the office, furniture, and accommodation at its own cost. This cost is deemed included in reimbursable expenses / total contract price. The consultant is expected to provide their own work computers and printers.

RESPONSIBILITIES OF THE CLIENT (NESCO)

The consultant shall work under the direct supervision of the Superintending Engineer, Project Planning, NESCO. The concerned offices NESCO shall assist the study team as required. In case of any unforeseen events, be it in terms of physical or social obstacles at field levels; the concerned field offices of the NESCO will take initiatives to solve it and ensure good working environment.

RESPONSIBILITIES OF THE CONSULTANT

The consultants shall carry out the study as detailed in the "Scope of Services" and "Responsibilities" in the best interest of the Company for the successful realization of the project with all reasonable care, skill sound engineering, administrative and financial practices and shall be responsible to the company (NESCO) for discharge of responsibilities.

SUPPLEMENTARY INFORMATION

Annexure 1: Planning Commission Form

Ministry of----------
Government of the People's Republic of Bangladesh

Feasibility Study for -- (Name of the Project/Projects)

----------(Month) 20---

Executive Summary

Summaries of the key findings of the Feasibility Study and Recommendations.

Project Feasibility Study Report

Section 1: Basic Information

1.	Name of the Project	:	
2.	(a) Sponsoring Ministry/Division (b) Implementing Agency	:	
3.	Project Objectives (Project to be taken based on the study)	:	
4.	Estimated Project Cost (Taka in Crore)	:	
5.	Sector & Sub-Sector	:	
6.	Project Category (Based on Environment Conservation Rules 1997)	:	
7.	Project Geographic Location (a) Countrywide (b) Division (c) District (d) Upazila (e) Others (City Corporation/ Pourashva)	:	
8.	Project Duration	:	

Section 2: Introduction

Describe the following:

(a) Project Background: Rationale and genesis (Mention the sources of information through reviewing the relevant documents);
(b) Objectives of the feasibility study;
(c) Approach and methodology of the feasibility study; and
(d) Organization of the feasibility study.

Section 3: Market/Demand Analysis

This section assesses the need for public investments and involves the elements listed below:

(a) **Problem Statement:** Provide an explicit definition of the problem to be addressed, identify the likely causes (both direct and indirect) of the problem and give a brief insight of the likely consequences if no intervention in public sector is made.

(b) **Relevance of the Project Idea**: Justify the need for the proposed project by linking the project(s) goals, outcomes and outputs to Global/National Development Plans/Policies and Sector Strategic objectives.

(c) **Proposed Project Interventions:** Describe the interventions (project inputs & outputs) that need to be undertaken by the government through the proposed project to address the

problem, describe the interventions undertaken earlier to solve this problem by this organization or other organizations (if any).

(d) **Stakeholders:** Identify the key stakeholders that are likely to be associated with the project interventions.

(e) **Demand Analysis:** Identify the need for public investments by assessing:

I. Current demand (based on statistics provided by service providers/regulators/ ministries/national & regional statistical offices for the various types of users);
II. Future demand (based on reliable demand forecasting models) in both the scenarios with and without the project; and
III. Various constraints and means to meet the demand including government regulations, technological developments etc.

(f) **SWOT Analysis:** Identify the Strengths, Weaknesses, Opportunities and Threats to the project.

Section 4: Technical/Technological & Engineering analysis

A summary of the proposed project shall be presented with the following headings:

i. **Location:** description of the location of the project including a geographical illustration (map and/or geo-coordinates) with justification. Availability of land is a key aspect; evidence should be provided that the land is owned (or can be accessed) by the organization, which has the full title to use it, or has to be purchased (or rented) through acquisition/requisition process. Besides, it should address if any kind of utility shifting is required. Identify the issues of disaster risks (existing and future) in the proposed location along with project site on hazard map.

ii. **Technical design:** description of the main components, technology adopted, design, standards and specifications. Key output indicators should be defined as the key physical quantities produced (e.g. meters, sq. meters, kilometers, numbers, man months, etc.). If the project is in disaster prone areas and has the probability of climate change impact, disaster and climate change risks related information should be integrated in technical design in order to address the impact of hazards on the project.

iii. **Output plan:** description of the output and the expected utilization rate. These elements describe the service provision from the supply side in the context of the forecasted demand.

iv. **Costs estimates** estimation of the financial needs for project design, implementation and operations, component wise cost estimates should be provided based on evidence.

v. **Implementation timeline:** considering the volume of work, capacity of implementing agency, budget flow (MTBF ceiling), project priority etc. a realistic project timeline along with the implementation schedule should be provided (for example, a Gantt chart with the work plan).

Section 5: Environmental Sustainability, Climate Resilience and Disaster Risk Analysis

5.1 Environmental, Climate Change and Disaster Risk Analysis

Specify and describe the economic effects/impacts of environmental, disaster and climate change and possible compensation for ecological damage. Key issues to be addressed:

(a) What are the likely environmental, disaster and climate change impacts or risks from the project (any impact of project to increase the existing disaster and climate change related risks and/or contribute to create new risks)?
(b) What counter measures should be taken to reduce these impacts?
(c) What is the cost for reducing/mitigating the negative impacts?
(d) Are there alternative ways of delivering the required services or goods without incurring these environmental costs? What are the costs of these alternatives?
(e) What types of assessments are required for the project (e.g. EIA/DIA)?
(f) Is there any resettlements to be addressed? If yes, provide resettlement modality in details.

5.2 Assessment of Disaster Resilience of the Project

This section assesses resilience and address about uncertainties. Key indicators need to be discussed:

(a) Contingency Plan for Emergency Disaster Management: Describe the evacuation plan if required, institutional arrangement for shutting down of utility services, and general procedures to be followed by individuals during disasters (Fire, Earthquake, Flood, Cyclone etc.);
(b) Business Continuity Plan: Outline the key response and recovery priorities. This plan will detail out how different utility services will be rendered to support the overall Emergency Management Plan;
(c) Time of Recovery: Required time for rehabilitation after a disaster; and
(d) Reporting of residual risks: Reporting of remaining risks after recognition and put in place adequate risk reduction measures.

Section 6: Cost-Benefit Analysis

6.1 Financial Analysis

Describe the components of costs and benefits at market prices including option analysis.

(a) Identify the components of cost & benefit;
(b) Transfer them in monetary value;
(c) Construct cash flow;
(d) Identify the Key Assumptions considered in exercises; then

(e) Compute the following indicators and interpret the results:
   I. Financial Net Present Value (FNPV)
   II. Financial Benefit Cost Ratio (FBCR)
   III. Financial Internal Rate of Return (FIRR)

6.2 Economic Analysis

Economic adjustments from financial data using standard conversion factors; after that costs and benefits are appraised from the point of view of the entire economy.

(a) Identify the direct, indirect and associated cost and benefit components;
(b) Adjust them where necessary;
(c) Convert the value of cost and benefit components into economic price by using Standard Conversion Factor (SCF) determined by the Government;
(d) Construct the cash flow;
(e) Mention the Assumption;
(f) Compute the following indicators and interpret the results:
   I. Economic Net Present Value (ENPV)
   II. Economic Benefit Cost Ratio (EBCR)
   III. Economic Internal Rate of Return (EIRR)

Section 7: Human Resources and Administrative Support Analysis (During Implementation and Post Implementation of the project)

Point out the functional structure and institutional capacity of the Agency (in terms of both Technical & Financial) required for implementation and operational stages of the project(s), sources of the workforce & financing need to be identified. Key issues to be addressed:

(a) What types of managerial and skilled workforces are needed during implementation and operational phases of the project?
(b) Does the project entity have ability to provide the managerial and skilled workforces needed for implementation of the project? If not, provide suggestions specifically.
(c) Does the implementing agency have institutional capacity (financial & technical) to retain the project output functional? If not, provide specific suggestions.
(d) Is the project entity equipped with skilled & experienced workforce to operate the project output? If not, provide specific suggestions.
(e) Does the entity have adequate funds under its recurring budget to incur the operational expenditure of the project output? If not, provide specific suggestions.
(f) Is timing of project consistent with organizational capacity (in terms of quantity and other)? A comparative statement should be provided considering experience of the entity in project implementation.

Section 8: Institutional and Legal Analysis

Illustrate the legal restrictions (if any) that may obstruct or impede the project during its implementation and functional stage of the project outputs, key issues are:

(a) Does the project match with the legal boundary (allocation of business or mandate) of the project entity?
(b) Are the capabilities and physical facilities of the agency being properly utilized?
(c) Is there any need for adjustment (reforms) in the policy and/or institutional setup?
(d) What adjustments may be required before the project is implemented?
(e) Do the institutions have suitable skills and capacity in line with the project requirements?
(f) Are there any incentives or penalties in place to ensure the project delivery on time and within the budget?
(g) Are there any critical governance issues that may affect implementation? If yes, state briefly.
(h) Are there any challenges related to cross-cutting issues to be addressed? If yes, a mitigation strategy would be suggested.
(i) Others (if any).

Section 9: Risk (Uncertainty) and Sensitivity Analysis

Issues regarding uncertainty in flow of costs and benefits throughout the project period should be taken into consideration. Guidelines must be formulated to stimulate different scenarios and to reduce the risks considering the relevant contractual clauses. The questions that need to be answered are:

(a) What are the major risks that may affect project?
(b) How will the project be affected if the risk event materialized?
(c) What are the possible mitigation measures needed?
(d) How sensitive are the assumptions used in the financial and economic models in an environment that differs significantly?
(e) Are there any risks, legal and regulatory obligations that could increase costs or decrease the benefits? If there are any, how much project implementation may be hampered or benefit of the project may be reduced?

Section 10: Alternative/Options Analysis

Option Analysis with recommendations & justifications. Technology and strategy recommended to achieve the goals and objectives of the proposed project should be described along with advantages and disadvantages considering various technologies and strategies applicable.

Section 11: Recommendation and Conclusion

Illustrate the solutions specifically to overcome the critical issues that may hinder the project implementation and that would be supported by different sections of analysis.

Section 12: Annexes

Attach detailed technical and engineering designs, plant prototypes design etc. Financial & Economic models and any supporting documents.