

Government of the People's Republic of Bangladesh
Local Government Engineering Department
The Construction of Important Bridges on Rural Roads (Phase-II) project
Terms of Reference (ToR)
for
Design Engineer

Package No: CIB2-S-03

1. Background of the Assignment

The Construction of Important Bridges on Rural Roads (Phase-II) project has been prepared to improve the rural transport and trading networks in line with the strategy improvement of rural connectivity as well as socio-economic conditions of the rural people. Due to construction of the small and medium bridges in rural roads, subsequently uninterrupted accessibility demand has increased to construct the large bridges in the existing gap in comparatively in large rivers. In the last couple of years, the honorable local representatives have demanded to construct significant number of bridges. As a result, after completion of feasibility study of bridges over the third and fourth category of river included in this project. These bridges will be ensured the marketing facility of agricultural and industrial products reduce marketing cost, time and established sustainable development. The project has directly reduced the rural poverty and indirectly improve health facility specially reduced the mother/child mortality rate, increase the enrolment of children in the school and women empowerment. For this reason, the project has been prepared would establish safe communication network by construct the climate resilience infrastructure after completion of the Environmental Impact Assessment (EIA), Hydro-Morphology Study, and Economic Feasibility Study (EFS) to address the risks of disasters related consequences as well as vulnerability of climate change.

This is GoB funded project and a portion of the project fund will be utilized to employ Individual Consultant (Design Engineer) for Detail Engineering Design of PSC or RCC girder bridges (Including Preparation of Structural Design, Cost Estimate, BOQ, Technical Specification, Tender Document, etc.) of bridges in different districts of different Upazila's under CIBRR-2 Project.

2. Objective of Consultancy Services

The objective of the consultancy services under the Terms of Reference (ToR) is to prepare and assist the team of consultants and the Local Government Engineering Department (LGED) to Detail Engineering Design, Detailed Cost Estimate, Construct and Supervision of important bridges on rural roads at different location of our country with specified technical standards, quality and time-frame.

3. Scope of Work of Design Engineer

The Design Engineer will work under the guidance of the Design Unit, LGED and the Project Director. He/she will be taken full responsibility for all aspects of Detail Engineering Design. He/she will be responsible and accountable for his/her works to the Project Director and the Superintending Engineer (Bridge Design), LGED and Team Leader cum Senior Bridge Engineer. The responsibilities of the "Design Engineer" would be, but not limited to, the following: -

1. Preparation of Architectural and Detail Structural Design of Bridges with approach road, River training works (if required), Slope protection etc.;
2. Review of all available reports such as Hydro-Morphological Study, Sub-soil Investigation report, Topographic Survey report etc.;
3. Review and check the Architectural and Detail Structural Design of Bridges with approach road submitted by the design consultant firm;
4. Assist to Detail cost Estimate, Bill of Quantities;
5. Assist Preparation of quality assurance plan;
6. Assist to prepare Supervision Methodology for implementation works;
7. Perform any other works assigned by the Design Unit (Bridge Design) and project Director of the Project and Team Leader cum Senior Bridge Engineer of Consultant Team.

3.1 Preparation of Architectural and Detail Structural Design of Bridges with approach road, River training works (If required), Slope protection etc.;

3.1.1 General Requirement

Services are to be provided by experienced professionals utilizing sound engineering knowledge and practices in large bridge project. The Consultant may utilize engineering, traffic and other data provided by related previous studies and reports but the responsibility for the accuracy of the data and its analysis and for all findings and conclusions shall rest with the Consultants.

3.1.2 Design Criteria

Typical issues of design criteria / standards that should require considerations are listed below.

Sl. No.	Issues
1.	AASHTO LRFD, Latest Bridge Design Standard of LGED and BNBC
2.	Width standards, bridge carriageway, foot path (carriageway, paved shoulder, earth shoulder), Bridge super structure geometry as per planning commission latest guideline and direction
3.	Necessary Navigational Clearance with respect to updated river class category on the basis of BIWTA and other study data and direction given by the BIWTA, Prime minister

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Sl. No.	Issues
	direction through planning commission
4.	Hydro-Morphology Feasibility study & BWTA Data
5.	Environmental Impact Assessment (EIA) report
6.	LGED latest Road Design Standard and specifications
7.	Utility services
8.	Slopes and cross-falls
9.	Junction design
10.	Road/Bridge safety
11.	Traffic Diversion Plan
12.	River Training work
13.	Electrification work

3.1.3 Architectural Plan and Detailed Engineering Design

- I. Design criteria for the design of bridge and ancillary structures are to be furnished in detail.
- II. Detailed engineering design of the bridge and ancillary structures shall be prepared conforming to AASHTO specifications.
- III. Fixation of length of the structure, Lay out plan, span arrangement and selection of type of the structure:
- IV. Width and length of the bridge, carriage way, vertical and horizontal navigational clearance of the bridge, foundations and substructure should be in conformity with the international design standard and structural requirements.
- V. Due considerations should be given to aesthetics of the structures suited to the ambient environment and minimize the risks of disasters considering multiple hazards in the respective area and climate change consequences in bridge design life.
- VI. Before finalizing the structural design and setting final layout of bridge, the EIA report of Concern Bridge must be considered.
- VII. It is noted that before preparation of final design of all bridges, the consultant must submit the Draft Final design to the design unit of LGED for the purpose of Vetting.
- VIII. After receiving the concurrence of design unit of LGED and if any comments including change of any specifications shall be incorporated in Final design & Drawing.
- IX. In case of approach road alignment and design will be follow more accessible path to avoid the land acquisition, improve future connectivity and better benefit of the community without disturbing the bio-diversity.

- X. Approach road design will be LGED updated gazette Road standard.
- XI. Some structure may be required to design by the co-ordination with the RAJUK, BWDB, RHD, and BIWTA and also with their NOC.
- XII. The calculations made regarding the structural design should be included in the design report and both soft copy and hard copy of drawings handed over to the LGED, PD office for future record of documentations.
- XIII. All drawings should be prepared in A-3 sheets and printed in offset papers with hard cover page and binding etc. completely.

3.1.4 Detailed Engineering Drawings

The design shall yield a comprehensive set of detailed drawings suitable for tendering and actual execution of the project. The drawings shall be conveniently sized for construction site and shall be drawn to suitable scales to provide clarity of comprehension. During the Preparation of Final Engineering Drawing, the aesthetic view of the bridge as well as the landscape of approach road must be considered and the Final Drawing of the bridge would be prepared on the basis of architectural point of view. Following detail structural design shall be submitted.

- Site Plan including proposed best suitable Bridge approaches with ancillary works.
- Bridge layout plan with benchmark references, boring and test pit location (Mention Global GPS Co-ordinate).
- Detail construction guideline and specification and any special design required for substructure or super structure construction.
- General view (Plan and Elevation) with necessary RLs and dimensions.
- Detail foundation and structural design of various parts of the bridge in accordance with hydro-morphological study report and Sub-soil Investigation report using suitable software
- Detail Reinforcement drawings.
- Bar bending schedule.
- Details of all necessary bearings and Joints, protection work and river training work (if required)
- Utilities and any other features, which may be, deem necessary by the designer.
- Detail Electrical drawing of bridge.
- Detail slope protection work (Nature based solutions preferable).
- Road and Bridge Junction details with safety measures.
- Diversion road (if necessary).

3.1.5 Setting of bridge layout plan and pile points as well as river training work (if required), global (RTK) GPS coordinate

After completion of detailed design and drawings, final bridge layout shall be checked by the client, design consultant (and representative of design unit if required) jointly. Layout shall be established using global (RTK) GPS coordinate during layout setting in presence of qualified survey expert and other support staff of the consultant and necessary survey equipment shall be ensured by the consultant during the setting of bridge layout plan.

3.1.6 Other Relevant tasks

1. Prepare detail structural designs of the selected bridges particularly PSC girder bridges using standard software based on preliminary design upon acceptance of the Design Unit.
2. Assist the Project Director in review the Structural design of bridges, prepare modification design of bridges and or any of their components (if needed) based on the actual site condition and problems encountered during construction.
3. Discuss with Design Unit and concerned Project Director for finalization of the preliminary design of selected bridges including the bridge alignment, length, geometry, hydraulic parameter, foundation type, protective works, approach road etc.
4. Review and provide necessary comments/suggestions (if any) to LGED on the topographical survey and sub-soil investigation reports conducted and submitted by consulting firms.
5. Review hydro-morphological study reports and provide comment/suggestions to LGED (if any) for finalization of hydraulic parameters of the selected bridges by the concerned consultant.
6. Guide the AutoCAD operator to prepare working drawings; ensure preparing all details of critical sections at appropriate scale; print the drawings in A-3 sheets; verify drawings with the structural design; correct dimensions; reinforcement position etc. as necessary and submit it to the Project Director/Design Unit for approval.
7. Assist and guide Estimator to prepare Detail Estimate of all works, Bill of quantities and technical specifications on the basis of LGED current rate schedule.

3.2 Review of all available reports

Review of all available study reports such as Hydro-Morphological Study report, Sub-soil Investigation report, Topographic Survey report etc. and suggest PD if any modification required.

4. Consultant's reporting obligations and deliverable submission

Output: a) Structural Design & Drawing (Detail Load Calculation) of bridge, river training work (if required) and approach road, protection work (if necessary). b) Electrical drawing, safety drawing etc. c) Cost Estimate of bridge, river training work and approach road etc. d) Setting layout plan of Bridge and river training work with RTK GPS coordinate.

5. Monthly Progress Report: The consultant shall submit a monthly progress report in brief and concise form using the approved format. The report will describe progress of activities planned for previous month along with plan for the next month. The report shall also state problems encountered, or problems anticipated together with steps taken or recommendations for their correction.

5. Duration of the Assignment

Duration of the assignment will be 60 (Sixty) months. It is expected to commencement date of consultancy services from February 2023.

6. Required Qualification and Experience

Educational Qualification

- Minimum B. Sc in Civil Engineering from any Government accredited University. Master's in structural Engineering and Experience in large Bridge design will be given extra preference.

Experience & adequacy for the assignment

- 15 (Fifteen) years of overall experiences, out of which 10 (Ten) years relevant experience as a consultant in designing large PSC/RCC girder bridges.

Other Competency

- Designing skill using Midas Civil will be given extra preference.
- Design expert in more than 100m bridges over river will be more preferable.
- Computer skill (Staad. Pro, Midas Civil, CSI Bridge, MS word, Excel, Power point, AutoCAD etc.),
- Training in relevant areas etc.

7. Institutional arrangements

The individual Consultant will work directly with the Project Director, Superintendent Engineer (Bridge Design), Design Unit and support the officials and staff of LGED at LGED district and Upazila in the project area, and at PMU LGED Headquarters, in order to achieve the objectives of the project. He/ She will be responsible for managing the team.

8. Logistics and Facilities provided by Client

LGED will provide office accommodation for the consultant. LGED may also provide necessary support staffs, Computer/Laptop, Printer and necessary consumables. Payments of which may be made from monthly payment as reimbursable item.

8.1 Study Reports, Traffic and Technical Data


LGED will provide the Consultant with all available data as and when required.


- All relevant studies so far done related to the project;
- Design manuals, standard designs of structures & other infrastructures, PPR-2008, LGED's Unit Rate Analysis and Unit Rates etc.


- Topographical survey map & sub-soil investigation report of proposed Bridge.
- Contract documents including design, drawing, price BOQ, technical specification etc.
- Maps of the country and location of the structures;
- Cost data on recent construction projects; and any other report as available in LGED.

9. Working station

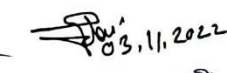
The Consultant will be based at LGED H/Q, but he/she may have to stay at the construction site for a month or longer as needed to address urgent situations. He/she shall have to frequently visit the field activities as per requirement of LGED even in holidays as emergency. The duration may be extended if necessary. If the consultant wants to change the service for another project of LGED, he/she have to take prior approval from the PD during submission of RFA for another Project in LGED. Otherwise, 2(two) months remuneration and reimbursable amount will be forfeited.

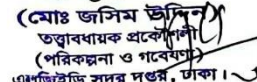

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শেখ মোঃ আবু জাকির সেকান্দার
প্রকল্প পরিচালক
পল্লী সড়কে গুরুত্বপূর্ণ সেতু নির্মাণ
(২য় পর্যায়) প্রকল্প
সদর দপ্তর, এলজিইডি, ঢাকা।

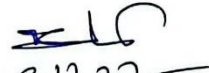

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মোঃ আব্দুস সাত্তার
নির্বাহী প্রকৌশলী
প্রকিউরমেন্ট ইউনিট
এলজিইডি, সদর দপ্তর, ঢাকা।


০৩.১১.২২
মোঃ আনোয়ারুল ইসলাম
অতিরিক্ত প্রকৌশলী (প্রকিউরমেন্ট)
এলজিইডি, সদর দপ্তর, ঢাকা।


০৩.১১.২২
Soma Nowrin
Executive Engineer
Procurement Unit
LGED, HQ. Dhaka


০৩.১১.২০২২
মোঃ গোলাম ইয়াজদানী
নির্বাহী প্রকৌশলী
প্রকিউরমেন্ট ইউনিট
এলজিইডি, সদর দপ্তর, ঢাকা।


০৩.১১.২২
মোঃ জসিম উদ্দিন
অতিরিক্ত প্রকৌশলী
(পরিকল্পনা ও গবেষণা)
এলজিইডি সদর দপ্তর, ঢাকা।


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মোহাঃ আব্দুল মালেক সরকার
অতিরিক্ত প্রধান প্রকৌশলী
(পল্লী অবকাঠামো উন্নয়ন ও যাবস্থাপনা)
এলজিইডি, সদর দপ্তর, ঢাকা।