

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF LOCAL GOVERNMENT RURAL DEVELOPMENT AND COOPERATIVES
LOCAL GOVERNMENT ENGINEERING DEPARTMENT

Program for Supporting Rural Bridges (SupRB)

TERMS OF REFERENCE (TOR)


FOR

Consultancy Services for

Inspection, Data Collection and Entry Services of Bridges/Culverts of Upazila and Union Roads with the help of Existing Rural Bridge Health Inspection and Condition Assessment Manual and RuBIMS Software of selected Pilot Districts of 8 Divisions

(Package No. SD47-1)

November 2023



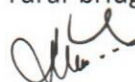
Terms of Reference (ToR)

For

Inspection, Data Collection and Entry Services of Bridges/Culverts of Upazila and Union Roads with the help of Existing Rural Bridge Health Inspection and Condition Assessment Manual and RuBIMS Software in selected Pilot Districts of 8 Divisions

A. Background of the Program

1. Bangladesh has an extensive roads network (roughly 361,000 km) out of which about 94% in length covers the rural roads. Upazila roads (UZRs) and Union roads (UNRs) composed of respectively 11% and 12% of the rural road network. Over a quarter (45%) of the rural road network is paved, with 92.67% and 77.58% of the UZRs and UNRs, respectively, are paved. Bridges play an important part in Bangladesh's land transport system. This is inevitable given the country's topography – low-lying flat lands, crisscrossed by many rivers and their tributaries. Typically, the bridges connect two separate road sections to provide full connectivity to isolated rural communities. Bridges are critical for the efficient operation of the road system. The current inventory envisages that a bridge is required for every 4.5km of UZRs and UNRs. Over four-fifths of these gaps now have structures, leaving a fifth of them to be bridged. The total number of structures on Upazila Road is 40,300 and the associated length of these structure is 406,450 meter and the number of gaps is 1,372 and the combined length of these gaps is almost 80,000 meters. The total number of structures on Union Road is 37,098 and the associated length of these structure is 316,650 meter and the number of gaps is 2,145 and the combined length of these gaps is almost 81,020 meters. Until 2019, the Government does not have any dedicated bridge construction and maintenance program. Nonetheless, none of the Development Partners were involved in rural bridge maintenance and rehabilitation activities.
2. In 2013, the Government of Bangladesh (GoB) adopted 'The Rural Roads and Bridges Maintenance Policy'. The objective of the policy was to develop a sustainable rural transport system through appropriate maintenance management to provide safe operation of vehicles and ensure necessary funding for maintenance. The policy document has emphasized the importance of maintenance of bridges and UZRs and UNRs. The policy also emphasized the importance of road safety, citizen participation, gender, and implementation management linked to the maintenance of rural roads and bridges.
3. Due to a shortage of funds, significant backlog exists in the maintenance of bridges on rural roads. Although the rural road maintenance budget has been steadily increased in the last ten years, it was not sufficient to manage the entire maintenance needs including bridge maintenance. In this context, the Government of Bangladesh has received a loan from the World Bank (WB) toward the cost of the program titled "Program for Supporting Rural Bridges (SupRB)". The program Components include Major and minor maintenance of 90,500 meters of bridges, rehabilitation of 4,000 meters of bridges, Capacity Expansion (Widening) of 2,500 meters of rural bridges, replacement or newly construction



of 18,936 meters of bridges, technical, fiduciary, procurement, social and environmental capacity improvement of LGED including design and implementation of climate resilient bridges and establishment and operationalize of Grievance Redress System (GRS). The bridge is identified in the prioritized annual work plan generated through a developed software popularly known as the Rural Bridge Information Management System (RuBIMS).

4. The Program will support the LGED's strategy for the sustainable development of Bridge Asset Management. The main strategic elements include undertaking the creation of new bridge assets and the preservation of existing assets comprehensively to enhance and preserve rural connectivity. Competitive selection of rural bridge interventions under budget constraints that will ensure an optimum balance between creation and preservation of assets; replacing rural bridges that surpassed their economic lives and making unsafe bridges safer; and improving institutional capacity and core business processes including the creation of a Rural Bridge Information Management System (RuBIMS) to help LGED in well informed decision making on Rural Bridge asset to aid in the planning, design, construction, and management of bridges sustainably. The Rural Bridge Information Management System (RuBIMS) has been developed under World Bank financed Second Rural Transport Improvement Project (RTIP2). RuBIMS is a comprehensive system for collection of all-inclusive data of rural bridges for aiding informed rural bridge management related decision making. It has a smartphone-based interface that facilitates collection of bridge data. Apart from facilitating capturing of rural bridge data by smartphone, the system has also a web interface which is capable of managing bridge/culvert data, calculating bridge health condition index as well as suggesting the type of maintenance intervention that a bridge will require and produces a list of prioritized bridges under different intervention types. The system uses a detailed algorithm in deciding the bridge health condition index, intervention types on bridge prioritization.
5. The road network which serves for the national socio-economic activities such as logistics, access to services, travels and transportation of goods, is compared to the vascular network in a human-body. To maintain a healthy human body, people may check their physical condition daily, and may have some advices from their doctors periodically and then keep their body condition in well, and sometimes people may receive medical treatment or surgery. It is the same concept for road infrastructure for movement of people, transportation of goods and other logistics. Therefore, the rural road infrastructure is very important for Bangladesh economy. The Bridges are part of the road infrastructure and are important link in a road network. And they must be very well maintained for growth of Bangladesh economy and to maximize the benefits from the investments.
6. Bridge inspection is one of the basic functions in the Bridge Asset Management System and play an important role in providing a safe transportation infrastructure for Rural Transportation network of Bangladesh. As the rural bridges continue to age and deteriorate, an accurate and thorough assessment of each bridge's condition is critical in maintaining a safe, functional and reliable transportation system. Bridge inspection is the most important step in the assessment process of the



physical condition of a bridge in order to determine remedial action, such as maintenance, repair, rehabilitation, strengthening, or replacement.

7. After development of the RuBIMS software just prior to closing of RTIP-II Project, there was not sufficient time available for piloting the software comprehensively at the field level. Hence, in order to achieve the desired outcome of the software and to develop the capacity of LGED engineers on the software operation, LGED intends to procure a consultancy service for piloting the RuBIMS for full scale operation in terms of inspection, data collection and data **entry services for bridge/culvert of Upazila and Union Roads** of selected pilot districts **with the help of existing Rural Bridge Health Inspection and Condition Assessment Guideline/Manual and RuBIMS Software.**

B. Objective of the Assignment

8. The primary objective of bridge inspection is to enter detailed inventory of bridge elements as well as Inspection for the condition of all the elements. Finding out the physical condition of the bridge elements and detection of any defects of the bridges at early stage that may affect safety of the users and bridge structures and to make the traffic flow smooth and comfortable by completing the required maintenance work. Another objective is to monitor development of the defects on the bridge continuously so that timely remedial measures can be taken to prolong the life of the bridge. In addition, the results collected from the inspection can be used to develop inspection and maintenance program, to carry out load capacity assessment, and to provide feedback to the design process.
9. Government of Bangladesh (GOB) has received financial assistance from the International Development Association (IDA), a member of World Bank Group (WBG), for 'Program for Supporting Rural Bridges (SupRB)' (the Program), which is being implemented by the Local Government Engineering Department (LGED). A portion of Fund has been allocated from the Program for the cost of consultancy services for Bridge/Culvert Inspection, Data Acquisition and Data Entry Operation for Rural Bridge Information Management System (RuBIMS) database with the help of existing RSDMS software for all existing LGED Bridges/Culverts/Existing Gaps in selected Districts of 8 Divisions Upazila and Union Road of Local Government Engineering Department (hereinafter designated as 'pilot survey area') as per Annexure-1. The objective of the consultancy is to operationalize the RuBIMS software comprehensively at the field level and develop capacity of the LGED officials in terms of inspection, data acquisition and data entry operation using RuBIMS software to deliver intended outputs and inform the decision-making process. Therefore, the consultancy service will therefore include extensive site visits to carry out in-depth inspection/investigation of each of the existing structures (bridges/culverts), collect all the relevant data/information with reasonable accuracy, organize the collected data/information to the bridge database. The bridges and culverts under the survey area may be concrete, steel or composite structures.



10. The LGED) is the Procuring Entity for this consultancy service. The Consultants are required to work in the pilot study area (list is in the Appendix) in close coordination with the Procuring Entity and LGED regional, District and Upazilla offices for site visits, inspection, data collection and other appropriate consultations.
11. The Procuring Entity through team(s) or committee(s) will assess of the consultant's performance from time to time.

C. SCOPE OF THE ASSIGNMENT

I. Project Management

12. Key Tasks and Responsibilities under the Project Management include but are not limited to:

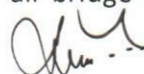
- Prepare or update the list of stakeholders (obtain Project Directors' approval), stakeholder management plan, communication plan and risk management plan of the project.
- Arrange PMU and District wise (minimum 9 training) training to share the features of Bridge Inspection, data collection and overall scope of the assignment. Ensure that all key stakeholders are present in the meeting. The duration of the trainings will be day-long and the venues will be provided by LGED.
- Ensure that all necessary permits and approvals are identified and obtained for these works. This includes but not limited to Government permits and approvals if required. Copies of all correspondence, applications, and authorizations with and from regulators must be provided to the PD for record keeping.
- Communicate, liaise, and meet with PMU, District Executive Engineer, Upazila Engineer and all other stakeholders on a planned basis all through the project.
- Arrange and lead Progress meetings with Stakeholders and Project Team in District and PMU; prepare minutes of meeting and Action Log with photographs wherever necessary. Maintain Risk Register, Regulatory Compliance Register, Cost Report, Project Schedule, Communication Plan, and other documents.
- Provide project correspondence, data, information, and other necessary documents during the project period, in hard copy and electronic format.
- Hire and manage the sub-consultants and contractors with prior approval of the Project Director to *complete* the field verification works, if required.
- ***Prepare a detailed Framework Plan for Bridge/Culvert Inspection and Data Entry as per requirements of the Procuring Entity. Develop the detailed work plan, logical sequencing and grouping of the activities to ensure best utilization of time, resources, and budget. Full considerations of required equipment for bridge condition inspection and vehicles for inspection in different locations need to be considered. Kindly consult annexes of this ToR, consult PMU and the Bridge health inspection and condition assessment guideline/manual, Rural Bridge Information and Management Software and manuals to detail the work plan.***



- Prepare and submit deliverables at 30%, 60%, 90% and 100% achievement of progress with supporting documents.
- Identify required regulatory conformance requirements and prepare regulatory approval packages for PMU and Regulatory Advisor review. Regulatory conformance is the adherence to compliance documents including but not limited to environmental legislation, regulations, guidelines, approvals, registrations, code of practices, commitments, bylaws, agreements as well as best management practices and LGED standards and practices.
- Extract and tabulate obligations from conformance requirements and assign tasks with due dates and responsible person(s) to satisfy all obligations.

II. Quality Management Framework

13. Accuracy and consistency of the data is important since the bridge inspection process is the foundation of the entire bridge management operation and bridge management systems. Information obtained during the inspection will be used for determining needed maintenance and repairs, for prioritizing rehabilitations and replacements, for allocating resources, and for evaluating and improving design for new bridges. The accuracy and consistency of the inspection and documentation is vital because it not only impacts programming and funding appropriations, it also affects public safety.
14. The Quality Management Framework consists of Quality Control (QC), Quality Assurance (QA) and QC and QA Framework. A QC/QA program is a means by which periodic and independent inspections, reviews, and evaluations are performed in order to provide feedback concerning the quality and uniformity of this bridge inspection and data entry assignment. One important matter is the QA Team will be constituted by the independent consultants working outside the Inspection and Data Collection Team while the QC consultants will be included within the Inspection and Data Collection Team. The QC consultants will be responsible for ensuring quality works through regular checking and testing. On the other hand, QA team will verify the quality of works on sample basis. The feedback will be used to enhance the inspection program through improved inspection processes and procedures, training, and quality of the inspection report. For any established system like RuBIMS the quality of data, how the data is evaluated and entered into the system determines the end results. So, all the major tasks i.e. bridge inventory data, bridge condition inspection data collection and data entry under this assignment are very important for a successful and effective and complete database. This complete database will be utilized to create Priority list of the bridges/culverts for maintenance with recommendation of steps for maintenance. To assure the desired quality of all task a Quality Assurance Team will also be formed. The Team Leader, Senior Official/Subject Matter Experts will be on the Quality Assurance Team. Both Deputy Team Leader and IT expert will help the Quality Assurance Team. In the beginning of every major task the quality assurance will involve more frequent quality audit as per the QA framework to be developed for the Inspection and Data Collection Team. However, as all bridge inspectors gain experience in doing



inspections, especially due to the fundamental changes to element inspections in general, questions and differences among practices may arise. Identifying these issues as early as possible in the process would both increase data quality and reduce the difficulties inspectors experience in field inspections. Comparative quality assurance checks of the earliest submitted inspection data several weeks into the process may help the Team to identify common problems and differences among inspection practices. Ultimately, the issues identified may lead to guidelines to be adopted by all inspectors, as part of quality control procedures, and may eventually be recommended to LGED to incorporate them into the manuals.

15. **Quality Control** – The quality of the inspection and reports rests primarily with the inspection team leaders and team members and their knowledge and professionalism in developing a quality product. The firm will establish a Quality Control (QC) procedure and will enforce the procedures that are intended to maintain the quality of the inspection at or above a specific level. To achieve the desired outcome of this assignment the consultant will develop quality control procedures for all major tasks (i.e inventory data, inspection and condition data collection, evaluation, data entry and all reports) and the teams performing that particular tasks will be responsible for the quality control of that task (bridge inspection team for inspection and data collection, Data entry team for data entry etc.).
16. **Quality Assurance** - Quality Assurance (QA) is the use of sampling and other measures to assure the adequacy of quality control procedures in order to verify or measure the quality level of the entire bridge inspection and data entry program. For this assignment the QA program will be accomplished by the re-inspection of a sample of bridges and will be performed by the Quality Assurance Team. The firm under this inspections and data entry assignment will ensure the QA by the QA corporate QA team mentioned above which is separate and independent of the inspection team.

Quality Control and Quality Assurance Framework

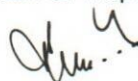
17. The firm will develop the following framework for a bridge inspection QC/QA program.

A. Documentation of QC/QA Program:

- Training of Bridge Inspectors and all other team members on LGED bridge inspection manual and RuBIMS mobile app and web application software,
- Elaborate on the purpose and benefits of the QC/QA program,
- Provide appropriate definitions.

B. Quality Control (QC) Procedures

- Define and document QC roles and responsibilities of the Inspection team members.
- Document required refresher training, including: Bridge Inspection training on the Manual, other specialized training, and/or periodic meetings.
- Document procedures for review and validation of inspection reports and data.



- Document procedures for feedback from QA results, identification and resolution of data errors, omissions and/or changes.

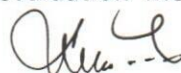
C. Quality Assurance (QA) Procedures

- Define and document QA roles and responsibilities.
- Document procedures for conducting office and field QA reviews, including:
- Procedures for maintaining, documenting, and sharing review results; including an annual report.
- Establish review frequency parameters. Parameters will include:
 - Recommended review % of bridges to be reviewed
 - Procedures and sampling parameters for selecting bridges to be reviewed.
- Procedures for reviewing current inspection report, bridge ID, and load rating.
- Define "out-of-tolerance" for condition rating
- Checklists covering typical items to review as part of QA procedures.
- Document procedures to validate the QC procedures.
- The LGED field level officials will also be involved in monitoring and quality assurance activities.

18. **Data cleaning as a QA of entered data** – RuBIMS data cleaning is the process of checking the entered data, fixing or removing incorrect, corrupted, incorrectly entered/formatted, duplicate, or incomplete data within the RuBIMS software. If data is incorrect, outcomes and algorithms are unreliable, even though they may look correct. Under this assignment the reviewed and verified data will be entered into the RuBIMS Server in consultation and with concurrence of concerned professionals of LGED. The data entry team lead by the IT Expert will enter all inspected and evaluated data into the RuBIMS Software and will ensure the QC of the data entry. The firm will establish a data cleaning process and will ensure accuracy of entered inspection data to the RuBIMS. The data entry operations will be routinely done following bridge inspection of structures in order to ensure completion of the entire task within the stipulated time of the consultancy period.

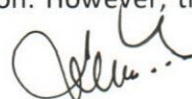
III. Bridge Inspection and Data Entry

19. Carry out inspection and evaluation of bridges and culverts under the pilot survey area. Bridge Inspection involves an engineering assessment process of the physical condition of a Bridge in order to determine remedial action, such as maintenance, repair, rehabilitation, replacement etc. The type and number of bridges/culverts under the pilot survey area is presented in Annex-I.
20. The Consultants will familiarize themselves with and trained their Team on LGED's bridge stock (types, components, etc.), detailed inspection and evaluation methodology in the light of LGED



Bridge Health Inspection and Condition Assessment Guidelines, Road Structure Database Management System (RSDMS), Rural Bridge Information Management System (RuBIMS) Web & Mobile App and other relevant guidelines/Manuals and Forms.

21. Conduct detailed inspection and assessment of the common distress of structures which may include but not limited to Corrosion, Crack in Steel, Loose or Missing Bolts, Fracture, Deterioration of Paint, Crack, Spalling/Exposed Rebar, Water Leakage / Efflorescence, Fallen out of Deck Slab, Crack of Deck Slab, Delamination, Abnormal Spacing, Difference in Level, Abnormal Bituminous Pavement, Functional Disorder of Bearing, Defects of Reinforcing Material for Rehabilitation / Strengthening, Abnormal Anchorage, Discoloration / Deterioration of Materials, Water Leakage / Puddle, Abnormal Noise / Vibration, Abnormal Deflection, Deformation / Break, Accumulation of Debris, Settlement / Tilt / Movement, Scouring, Other Types.
22. Conduct Bridge/Culvert Inspection including Collection of Basic Data of Structures, Condition Inventory with video and still photographic support. Alongside visual inspection, the Consultant will carry out detailed inspection with the aid of different advanced inspection tools and instruments such as speed Boat, Ladder, Rebound Hammer, Inspection Hammer, Crack Scale, Binocular, GPS, Drone, Robot Camera, Rebar Detector, Salinity Measuring Instrument, Vernier Caliper, Laser Range Finder etc. The inspection will include under-bridge inspection for super-structure. The consultant must verify existing inventory data in RuBIMS for accuracy and update if required and must input all condition data and rate them as per the Inspection Guideline in RuBIMS.
23. Find out the construction year of the bridges either from the list supplied or discussing with the concerned officials and input the same into RuBIMS.
24. Find out the name of the channels under the bridges.
25. Determine the type of the pier and if possible, type of the abutment.
26. Take accurate data of latitude and longitude so that a bridge/culvert can be tracked on maps. Correct RuBIMS if necessary to input the correct GPS location data.
27. Conduct regular verification of the collected data, organize them, and prepare bridge inventory.
28. After inputting the basic data, consult with the concerned officials of the division and provide the list of the bridges. Solve issues involved with the list if any.
29. The Bridge/Culvert Inspection and data collection must be carried out by using the (i) RuBIMS Mobile App as well as by (ii) filling up the Bridge health/condition Inspection Sheet as per Bridge health condition inspection guideline. **Submitting to PD and keeping the manual records (hand filled)** of all data in Inspection Sheets as per LGED's Bridge Inspection and Condition Assessment Guideline **are mandatory by the consultant firm and its Inspectors, regardless of digital data storing in RuBIMS software.** This is to avoid risk of malfunctioning of RuBIMS. The Inspection sheets for all inspections have to submitted to PD, SuPRB project/focal person. However, the consultant must carry out data



entry for verified data into the RuBIMS Server as per requirement of the Procuring Entity. This data entry operation will be carried out by one or more expert team(s) consisting of a Bridge Inspector, and a data entry operator. An IT expert shall supervise the data entry process and will be responsible for quality assurance. This data entry operation will be routinely done following bridge inspection of structures in order to ensure completion of entire task within the consultancy period and hence the consultant may consider deploying necessary qualified personnel to accomplish the task within the stipulated time.

30. Carry out physical investigation and data entry operation into RuBIMS Software of approximately 3,040 numbers of bridges of 87,858-meter length and 8,169 numbers culverts of 41,689-meter length and 507 numbers of gaps of 41,005-meter length under the pilot survey area. The lengthwise category details of bridges/culverts are inserted in Annex-I. The list of the bridges supplied from the field offices is very tentative so 25% allowance have to be considered for planning and cost estimation purpose
31. Prioritize the Bridges/Culverts through RuBIMS Software following existing Manuals. After Evaluation, the Bridge Category will be A, B, C and D with A being the bridge which will need no repair and D being the most severe ones.
32. LGED and the consultants will jointly train the field officials and the inspectors on Bridge Inspection and Data entry Operation.
33. Improvements of the Guideline - Bridge Asset Management (BAM) and its related concepts are relatively new field in Bangladesh. So, as the BAM continues to be improved; it is intended that parts of Bridge Health Inspection and Condition Assessment Guidelines and information contained in the inspection Guidelines need to be reviewed and updated from time to time as necessary to take into account the organizational framework of LGED. So, as part of this assignment the accumulated inspection experiences, and new knowledge has to be provided to LGED as lessons learned for further improvement of the Guidelines.

IV. Upgrading and Maintenance of RuBIMS Software and Database

34. The successful consultant of this assignment must work closely with LGED field officials, LGED H/Q Official and RuBIMS Operation and Maintenance consultant (under recruitment process) n operationalization of the existing RuBIMS software and make it ready for data collection and entry in consultation with Management Information System (MIS) Cell of LGED.
35. The RuBIMS software is newly developed; hence the consultant of this assignment must work with RuBIMS Operation and Maintenance consultant (will be responsible for Operation, Maintenance and necessary upgrade) in identifying and resolving any issues (if occurs during the use of the RuBIMS mobile App and data entry or storage in the RuBIMS software; i.e, fixing any bugs during operation)



with the system and must provide with necessary recommendations for further improvements to the RuBIMS.

36. Verify and recommend for adding any features or upgrading version of the RUBIMS software and Mobile App as directed by the client.

D. Implementation Arrangements:

37. The Local Government Engineering Department (LGED) is the executing agency for the assignment. The Client reserves the right to request the Consultant to replace the expert(s) with poor performance, and/or to terminate the contract and recruit new Consultant for completing the works under the assignment. In addition, LGED will assign a Technical Steering Committee to monitor and review the consultant's performance, reports and provide technical guidance as required. Respective field divisions can monitor the activities through their officials the performance of the consultants in the field.

E. Consultant's Inputs Regarding Staffs

| Sl. | Designation & Number | Qualification | Experience | Specific Tasks | Maximum Man-months (Indicative) |
|---|--|---|---|--|---------------------------------|
| Required Key Personnel and Minimum qualification of the Consultant Team | | | | | |
| 1 | Team Leader (Sr. Bridge Engineer) (1) | BSc in Civil Engineering (Post-Graduation degree in related field shall be preferred) | <ul style="list-style-type: none"> • Minimum 15 years of Professional Experience. • Preferably 3 years of Similar Experience specially on bridge health condition assessment and planning of maintenance operations of bridges. • Preferably 5 year's experience on designing /reviewing of bridge designs and | <p>Communication and coordination with the client, Supervise and guide the team members during Bridge Inspection and Data Entry. Prepare QC/QA framework plan, and prepare and submit required reports to the client</p> <p>Develop and train Inspection Team. Conduct/Supervise Physical Inspection, Supervise Data Entry</p> | 1x6=6 |

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|---|-----------------------------------|--------------------------|--|---|---------|
| | | | <p>construction supervision of bridges.</p> <ul style="list-style-type: none"> • Experience on planning and designing climate resilient designs of bridges will get preference. Experience on Bridge Retrofitting works shall be given priority. • Any Professional Certification on bridge inspection shall be given preference | <p>/RuBIMS Team., Prepare Reports, Support inspection team with inspection tools as necessary, any other task related to the assignment.</p> | |
| 2 | Engineering Survey Specialist (1) | BSc in Civil Engineering | <ul style="list-style-type: none"> • Minimum 10 years of Professional Experience. • Preferably 3 years of professional Survey experience using Total Station • Any Professional Certification on digital Surveying shall be given preference | <p>Support inspection team in completing digital survey works using internet based Total Station technology in all types of surveying of Bridge/Culvert/existing Gaps Train and Building Capacity of Bridge inspection team and other officials for all kinds of survey works</p> | 1X6=6 |
| 3 | Bridge Inspector (16) | BSc in Civil Engineering | <ul style="list-style-type: none"> • Minimum 5 years of Professional Experience. • Minimum 1 year of bridge inspection/bridge retrofitting | <p>Collection of Basic Data and conditions inspections of Bridges/Culverts/existing gaps using both hard copy and RuBIMS mobile apps Generate</p> | 16x6=96 |

| | | | | | |
|---|--------------------------|--|--|---|-------|
| | | | <p>experience</p> <ul style="list-style-type: none"> Any Professional Certification on bridge inspection shall be given preference | <p>Inspection Sheets, Conduct Bridge/Culvert Inspection as per manuals, Data entry into RuBIMS</p> | |
| 4 | DTL cum IT Expert (1) | BSc in Computer Engineering from a recognized university or equivalent | <ul style="list-style-type: none"> Minimum 5 years of Professional Experience. Minimum 2 years of similar experience Software Engineering and Programming will be treated as similar experience. Experience in Any bridge related software or similar software will be given priority. | <p>Planning of data collection and data entry into RuBIMS software, Preparation of training manual and acting as a trainer in the data collection and data entry operation, assisting the TL in preparation of QC/QA framework and plan, acting vital member of the QC team to check and validate data, supporting the team in data cleaning process, updating RuBIMS (if necessary) software in consultation with the designated officials of MIS unit and having concurrence from LGED. Any other tasks related to the assignment. Software Maintenance, Data Entry, Generate prioritized output as prioritized list of bridge maintenance.</p> | 1x6=6 |
| | | | Total | | 114 |

| Required Support Staff and Minimum Qualification | | | | | |
|--|-------------------------------|--------------------------------|--|--|---------|
| 6 | Site Engineers (16) | BSc in Civil Engineer | <ul style="list-style-type: none"> • Minimum 3 years of Professional Experience. • Minimum 1 years of similar experience | Assist Bridge Inspectors in Inspection of Bridges | 16x6=96 |
| 8 | Data Entry Operator (1) | Graduation | <ul style="list-style-type: none"> • Minimum 3 years of General Experience. • Minimum 2 years of similar experience. • Data Entry work will be treated as similar experience. | Data Entry into BMS | 1x5=5 |
| 9 | Office/Site Assistant (8+1=9) | Secondary School Certification | - | Help moving the tools, work as per the direction of inspection team. | 9x6= 54 |
| Total | | | | | 155 |

F. Outputs:

38. The outputs of the required technical assistance services are as follows;

1. Detailed plan for Bridge/Culvert Inspection and Data Entry using the RuBIMS Mobile App/Inspection Form Services within 7 days from the contract signing.
2. Report on Quality Management Framework including QC/QA Framework and Plan
3. Development of Training Manual for Inspection, Data Collection and Data Entry using RuBIMS mobile App and Web Application Software.
4. Basic data of bridges
5. List of the bridges with necessary details after completion of bridge inspection in each district with categorization such as A,B,C,D.
6. All Data of Bridge Inspection and related inspection sheets.
7. Complete data base through Data Entry to RuBIMS
8. Priority List for Bridge Maintenance/rehabilitation/repair/replacement/other works in all districts under scope of this service.
9. Recommendation on updated to the Bridge Health Inspection and Condition Assessment Manual
10. Reports as per TOR and RFP Reporting Requirements (Cluse G).

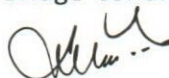
G. Dissimination of deliverables and Outputs:



39. The consultant will share the draft deliverables to the senior level of LGED Officials through workshops at least one during inception phase on Inception Report and one on the draft final reports at the LGED HQ. Besides, the consultant shall share the plans methodologies and outputs with the Technical Co-ordination Committes for this consultancy and seek their advice from time to time to implement the tasks.

H. Reporting Requirements

40. The reporting requirement shall be as per below:
41. **Inception Report:** The Consultant shall submit and present an inception report within half month after signing the contract. The report will include the consultant's proposals of the detailed project implementation arrangements and the planned activities for different components based on the initial assessment. The report will also include the detailed work program and approach towards the assignment. The report will include Quality Management Plan including Quality Management (QC/QA plan) framework. The Inception Report will also include the details of the nine training programs and must obtain LGED's approval of the training program. The report needs to be finalized within 15 days after receiving the comments from LGED. **5% payment** may be paid upon accept once of the Final Inception Report.
42. **Monthly Report:** The consultant will submit a monthly report which must reflect all the activities undertaken during the month of the reporting period. The report must contain the targets and achievements.
43. **First Interim Report:** The consultant shall furnish First Interim Report on actual methodology with pictures, bridge list with details, inspected data, data entry status. Completion of Bridge Inspection and Data Entry (to existing RuBIMS and completion of Training Manual on Inspection, Data Collection and Data Entry with completion of all trainings) of bridges/culverts of 10% of each category's bridge/culvert length. Manual/hand filled inspection sheets as per Bridge condition assessment guideline will be annexed with the report. Comparative description of data analysis by manual data collection and by RUBIMS system has to be discussed in one separate chapter. Any discrepancy/anomaly/difficulty between RuBIMS and the condition assessment guideline should be detailed and possible alternate solutions needs to be recommended for corrections. The Consultant shall submit the report within two months after signing the contract. **(Minimum 30% of the total length of the bridge must be completed and accepted by the PD; 20% payment may be paid)**
44. **Second Interim Report:** The consultant shall furnish First Interim Report on actual methodology with pictures, bridge list with details, inspected data, data entry status. Completion of Bridge Inspection and Data Entry (to existing RuBIMS) of bridges/culverts of 40% of each category's bridge/culvert length. Manual/hand filled inspection sheets as per Bridge condition assessment guideline will be



annexed with the report. Comparative description of data analysis by manual data collection and by RUBIMS system has to be discussed in one separate chapter. Any discrepancy/anomaly/difficulty between RuBIMS and the condition assessment guideline should be detailed and possible alternate solutions needs to be recommended for corrections. The Consultant shall submit the report within four months after signing the contract. **(Minimum 60% of the total length of the bridge must be completed and accepted by the PD; another 20% payment may be paid)**

- 45. Third Interim Report:** The consultant shall furnish First Interim Report on actual methodology with pictures, bridge list with details, inspected data, data entry status. Completion of Bridge Inspection and Data Entry (to existing RuBIMS) of bridges/culverts of 70% of each category's bridge/culvert length. Manual/hand filled inspection sheets as per Bridge condition assessment guideline will be annexed with the report. Any discrepancy/anomaly/difficulty between RuBIMS and the condition assessment guideline should be detailed and possible alternate solutions needs to be recommended for corrections. The Consultant shall submit the report within five months after signing the contract. **(Minimum 90% of the total length of the bridge must be completed and accepted by the PD; another 20% payment may be paid)**
- 46. Draft Final Report:** This report is to be submitted after completion of services but within the completion period. This report will include complete pictorial Inspection report of all bridges along with summary of Bridges, Priority list of the Bridges with recommendation of steps for maintenance and lesson learned from the assignment (constraints and how they overcame them) should be submitted with the report. Submission of the recommendations on update of the Bridge Health Inspection and Condition Assessment Manual. 100% of the total length of the bridge must be completed and accepted by the PD. **Another 20% payment may be paid**
- 47. Final Report:** The consultant shall prepare a comprehensive final report incorporating all the modification of draft final report as per the feedback of client. The final payment may be paid upon 100% completion of inspection, data entry, all reports using RuBIMS and acceptance of the Final Report. **another 15% payment may be paid**

H. Duration

48. The assignment is expected to commence in March 2024 and continue up to about 06 (Six) months.

I. Facilities provided by the client:

49. Provide guide/related manual for the assessment work.
50. Accessibility to Existing RuBIMS Software (mobile app. and web version) for Inspection and Data Entry.



51. Accessibility to Existing RSDMS Software
52. List of Bridges/Culverts with road name
53. Accessibility to the Project Area

Appendix – I

Summary of Bridge/Culvert by District

| SL No. | District | Upazila Road | | | | | | | | Union Road | | | | | | | | Total Length (Including Gaps) (m) | Total Length (Excluding Gaps) (m) |
|----------------|-------------|--------------|-------------|-------------|--------------|-------------|--------------|--------------|-------------|------------|-------------|-------------|--------------|-------------|--------------|--------------|-------------|-----------------------------------|-----------------------------------|
| | | Road Info | | Culvert | | Bridge | | Existing Gap | | Road Info | | Culvert | | Bridge | | Existing Gap | | | |
| | | Nos. | Length (km) | Nos. | Length (m) | Nos. | Length (m) | Nos. | Length (m) | Nos. | Length (km) | Nos. | Length (m) | Nos. | Length (m) | Nos. | Length (m) | | |
| 1 | GAIBANDHA | 74 | 555 | 488 | 2283 | 93 | 2868 | 2 | 1502 | 164 | 749 | 619 | 2502 | 90 | 2926 | 5 | 156 | 12237 | 10579 |
| 2 | NATORE | 68 | 518 | 310 | 1572 | 68 | 2447 | 2 | 0 | 126 | 709 | 313 | 3428 | 58 | 1282 | 11 | 473 | 9202 | 8729 |
| 3 | KUSHTIA | 65 | 611 | 289 | 1258 | 91 | 2565 | 1 | 10 | 89 | 505 | 205 | 871 | 60 | 1602 | 2 | 81 | 6386 | 6296 |
| 4 | JAMALPUR | 88 | 614 | 382 | 2359 | 187 | 11322 | 15 | 2253 | 135 | 645 | 329 | 1934 | 136 | 6626 | 23 | 1603 | 26097 | 22241 |
| 5 | GOPALGANJ | 83 | 600 | 237 | 1701 | 323 | 8419 | 13 | 1462 | 105 | 513 | 239 | 1808 | 245 | 5307 | 11 | 274 | 18971 | 17235 |
| 6 | B.BARIA | 59 | 515 | 425 | 2872 | 219 | 8928 | 26 | 1546 | 122 | 561 | 423 | 2888 | 167 | 3715 | 43 | 1793 | 21741 | 18402 |
| 7 | PEROJPUR | 61 | 479 | 1085 | 3686 | 338 | 7551 | 54 | 1383 | 102 | 545 | 889 | 2992 | 424 | 6597 | 286 | 1807 | 24016 | 20826 |
| 8 | MOULVIBAZAR | 57 | 467 | 890 | 3507 | 96 | 2658 | 5 | 115 | 118 | 655 | 1120 | 4220 | 92 | 1438 | 29 | 138 | 12075 | 11822 |
| Total = | | 555 | 4359 | 4106 | 19237 | 1415 | 46757 | 118 | 8271 | 961 | 4882 | 4137 | 20643 | 1272 | 29493 | 410 | 6325 | 130726 | 116130 |

Appendix – II

District Maps of 8 Pilot Districts
(will be available in the RFP stage)

Appendix – III

Sample – Completed Bridge Inspection Form
(will be available in the RFP stage)

