GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

Ministry of Education
Directorate of Secondary and Higher Education (DSHE)

Terms of Reference (TOR)

FOR

CONSULTING SERVICES

FOR

FEASIBILITY STUDY, DESIGN AND DRAWING OF NEW BUILDING FOR DSHE IN DHAKA

CONTRACT NO: SESIP-SPSU/SD-8/2015-16

JULY 2016

19 June 2014 – Draft 1

TERMS OF REFERENCE
(TOR)

Consultancy Services for
Feasibility Study, Design and Drawing of New Building for DSHE in Dhaka
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1. Program Background

The Directorate of Secondary and Higher Education (DSHE) has been allocated public funds from the Government of the People's Republic of Bangladesh (GOB) and the Asian Development Bank (ADB) towards the cost of Secondary Education Sector Investment Program (SESIP). The program will have three outputs: (i) enhanced quality and relevance, (ii) increased equitable access and retention, and (iii) strengthened education management and governance. The investment program is designed to be implemented over 10 years from 2013 to 2023. Tranche 1 will be implemented from FY 2013/14 to FY 2016/17 and will finance the development and delivery of a more market relevant and inclusive secondary education curriculum, in accordance with the National Curriculum Policy Framework (NCPF). Tranche 2 to be implemented from 2015 to 2017 will finance introduction of more market relevant pre-vocational and vocational subjects at general and *madrasha* schools. To further strengthen Tranche 1 and Tranche 2, Tranche 3 from 2017 to 2021 and Tranche 4 from 2019 to 2023 will be required.

2. Rationale of the Program

The program has been designed to make the secondary education more relevant to job market and thus it would reduce the percentage of people living below the poverty line. This would help achieving the target status of the middle income country by 2021 as set forth in 2021 vision.

3. Objective of the Program

The overall objective of the Secondary Education Sector Investment Program is "To reduce the poverty in Bangladesh by establishing a more relevant secondary education in terms of quality, efficiency and equity through improving the secondary education sector as a whole."

4. Objective of the Assignment

Shikkha Bhaban (DSHE Building) was constructed in 1960. The activity of DSHE has been increased by many folds as the number of educational institutions (schools, *madrashas*, training institutes and colleges) has increased to about 33,000. At the same time the DSHE is implementing a significant number of development projects which are located in Shikkha Bhaban. At present DSHE has to conduct a large number of activities.

The accommodation capacity of DSHE office building is very much insufficient. Having the reasons, DSHE is badly in need of a new building with wider capacity. The construction of 22-storied *Shikkha Bhaban* complex was discussed with ADB Mission and the Mission agreed to fund for Feasibility Study and Design & Drawing under Tranche-2. Then in Tranche-3, the construction of an approximately 22-storied Complex (2 basement, 1 ground floor, 19 floors) as

determined will be accomplished. The 22 stories is an approximation. The exact number needed will be determined during the feasibility study.

The main objective of the assignment is to carry out the feasibility study for construction of an approximately 22-storied DSHE Building at Dhaka and prepare all necessary design, drawings with all modern facilities and requirements including quantity estimations, preparation of BOQ and Bid documents, bidding processing, evaluation of bids, selection of contractor and award of contract. The design will include a data center with capacity for a significant number of servers. The design will also be environmentally friendly, with renewable energy included. Good practice of public agency buildings in Bangladesh should be applied, with consideration of innovations as a model for new public building structures. A temporary relocation plan, and a demolition plan will be prepared.

5. Assignment Phase and Duration

The duration of the assignment for the consultancy services under Time-based Contract is for twelve (12) months for Phase-I tentatively commencing from January 2017.

Phase I: Feasibility Study including Land Survey and Investigation, Preliminary designs and drawings, Working designs and drawings, Quantity estimating, Preparation of BOQ and Bidding Documents etc.

- Feasibility Study: six (6) months
- Completion of detailed drawing and design: six (6) months.

The consulting services will be carried out over a period of twelve (12) months i.e until December, 2017, comprising of 76 person-months of inputs including 9 person-months of International Expertise and 67 person-months of National Expertise for **Phase I** as detailed in **Table 1** under **Para 16** of this TOR.

6. Assignment Location

The location of the assignment will be in Dhaka and the construction site will be at 16, Abdul Gani Road, Dhaka-1000, Bangladesh.

7. Implementation Arrangement

The assignment will be carried out under the following implementation arrangement

- Ministry of Education (MOE) will be the Executing Agency (EA) and the Directorate of Secondary and Higher Education (DSHE) will be the Implementing Agency (IA) of the program. The highest level of oversight will be the Inter-Ministerial Sector Program Steering Committee (SPSC) led by the Secretary, MOE. The second level of support arrangement would be at the level of the implementing agency which is the Directorate of Secondary and Higher Education (DSHE). The third level of facilitation is a Sector Program Support Unit (SPSU) which would be comprised of management team led by Program Director (DG, DSHE) supported by Joint Program Director with its officials and staff

- The consulting firm will be recruited following the ***Guidelines on the Use of Consultants by Asian Development Bank and its Borrowers, March 2013 (or latest version).*** The consultants of the firm shall work in close cooperation with, under direction from, and with satisfaction of the DG, DSHE, under his/her overall technical guidance. The Consulting firm will be responsible for performance of its assignment on day-to-day basis to DG, DSHE, Chief Engineer, EED and the Team leader already appointed by DSHE
- DSHE and EED will be in overall charge for execution of the works as the delegated authority and the co-implementing agency of the program
- Program Management Consultant (PMC) will provide any support, as and when necessary

8. Scope of Consultancy Services

The Consultant shall provide services for the following but not limited to:

- Undertake feasibility study and drawing design for DSHE new building be 22-storied (with 2-basement for parking, 1-ground and 19-floors)
- Review of all documents relating to existing infrastructures/report available with DSHE and MOE
- Technical and financial review and Analysis of multiple options with specific recommendations for acceptance of the Client
- Review all national and international design codes, standards and practices for determining its applicability and suitability
- Preparation of topography survey report, master plan with landscaping
- Environmental Impact Assessment (EIA)
- Detailed Geo-technical investigation
- Detailed architectural design & drawings
- Detailed structural design & drawings considering the Earth Quake
- Detailed electromechanical design & drawings
- Detailed design of Electrical Substation
- Detailed design of Lift, Fire pump, HVAC
- Detailed design of rain water harvesting
- Detailed design of Solar energy
- Detailed design and drawing of Sanitary and plumbing
- Detailed design and drawing of Fire protection and fighting system, gas line

- Detailed design of any other civil, electrical, mechanical, ICT based networking, installation, connectivity etc.
- Detailed re-location plan for existing resources, manpower, parking, and necessary facilities to run the DSHE agency while demolition and construction is underway
- Detailed demolition plan
- 3-D scale model of the selected design for display
- Assistance for approval of designs and drawings by RAJUK and other relevant agencies
- Detailed cost estimation (BoQ).
- Preparation of Bid documents.
- Preparation of progress and monitoring report including briefing notes whatsoever
- Any other as requested by the Client

9. Client's Perceptions about Requirements

The Client has the following perceptions about its requirements and facilities in the proposed DSHE Building which the Consultant is expected to take into account in carrying out the feasibility study, preparation of design and drawing etc for ultimate construction, installation whatsoever:

- Study options for RCC Frame Structure and Composite Frame Structure and provide recommendations for one of the TWO options supported by detail environmental, technical and financial justifications with analysis
- Two Basement Floors of ± 2,500 sqm
- Twenty Other Floors of ± 22,500 sqm
- Provision for required Penthouse
- Provision for Four Lift Machine Rooms: 2 nos. Passenger lifts of adequately higher capacity and 1 No Passenger Lift with lower capacity and 1 no Cargo Lift for adequate loads
- Provision for data center with significant number of servers
- Infrastructural provisions for disabled persons
- Braille provisions in the Lifts and other important places like room number, washroom, etc.
- Parking Provision for projected density of motor vehicles
- Emergency evacuation
- Loading Dock

- Connecting bridge between new and existing 10-storied building
- Helicopter Landing on roof top
- Central air-conditioning system with multiple units
- Sub-station, Stand-by Generators
- Telephone, TV, CCTV network and electronic display
- Internal Road Network Improvement Plan
- Surface drainage development plan
- Muralee, canvass, outdoor sculpture, art, representing national heritage and education
- Electronic security system
- Canteen, cafeteria
- Books and publications Sale corners, flyers, displays etc.
- Rainwater harvesting Plan
- Solar Power System Plan
- Environmentally and gender friendly
- Tentative ratings with respect to any of the internationally recognized green building ratings (For example US Green Building Council, Green Building Council of Australia etc.)
- Boundary Wall, Gate, Landscape, Arboriculture etc.
- A Contingent Plan for physical demolishing of the existing building with provision of relocation of the existing resources/offices
- A Contingent plan for renovation of the existing adjoining structure to match with the new DSHE building
- Premise Gardening

10. Detail Scope of Consultancy Services

10.1 Site investigation:

The Consultant will carry out the field investigation work including site analysis, EIA & feasibility study, master plan with landscaping, land survey, sub-soil investigation, etc. as per requirements for the construction work and as per the following procedures:

10.1.1 Environmental Impact Assessment & Feasibility Study

EIA is a systematic analysis of all environmental impacts arising out of a developmental activity. Depending on type and magnitude of impacts, mitigation measures are suggested to keep the overall environmental quality impact. Efforts are also made to further enhance

environmental aesthetics and socio-economics in this area. The purpose of an EIA is to ensure that the environmental effects of a proposed development are properly considered.

Environmental impact assessment (EIA) may contain:

- A description of the proposed development site and its use.
- An estimate of the likely residues and emissions resulting from the construction and operation of the development. (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.).
- An assessment of disposal/reuse of construction debris
- An assessment of how the development complies with planning policy.
- An assessment of environmental opportunities and constraints.
- An assessment of solid waste management, additional load on sewerage, traffic congestion
- An assessment of the likely impacts of the development
- An assessment of Safety & Hygiene during construction and operation.
- Carbon footprint analysis.

10.1.2Site analysis

The Consultant will carry out site analysis to locate the best possible location and Orientation for the construction taking into consideration the topography, soil characteristic and accessibility of the site and location of site, services like power, gas and water supply, etc.

The Consultant will visit the site and will take note of the general configurations of the site, topographical features, soil characteristics, approach to and from the site, usage of surrounding areas, site services like power, water and gas supply, sewerage and drainage system. They will also collect information on vegetation of the area, climatological data like sunlight, wind direction, rainfall, effect of rain flooding, water logging in the site, etc.

Based on the field information collected, the Consultant will make recommendation to the Client regarding the selection of the site. The Consultant will prepare a tentative site layout plan in order to consider its suitability for the proposed facilities; clearly indicating the positions of the existing temporary and permanent structures. The Consultant will make recommendations for the improvement of the sites and the existing site services, if any, for consideration and approval of .the Client. The Consultant will submit a block layout study of the site, to Client for its approval.

The Consultant will submit a set of preliminary site report commenting on the technical suitability, cost factor, construction difficulties and other factors related to any other problems to the Client for approval.

10.1.3 Land- survey

The Consultant will do the detailed topographical survey of the plot, the land area to a suitable scale showing all spot levels to indicate the slope and configuration of the land area including the record of highest flood level experienced in the locality in and around the site. Survey will also be conducted for the location of existing buildings, structures and services, overhead and underground installations, service lines, trees and plantations, etc. Drawings will be prepared to suitable scale showing specific topographic and other data as follows:

All spot levels including contour lines to indicate the slope and configuration of the land. Difference of elevation of the project area with respect to adjacent areas and location and invert levels of outfall of drain (if any) within or adjacent to the site

- Direction and length of each property line
- Total area of the site
- Location of permanent bench mark locations set within or adjacent to the site
- Location, outside dimensions and description of all existing structures within the site, if any
- Location types and size of all roads, waterbeds, walls, vegetation, utilities services etc.
- Location of all septic tanks, soak wells, underground reservoirs or other underground structures within the site and

- Location of Overhead services lines, power telephone with the location of poles. The Consultant will submit 4 sets of the report to the Client for their record
- Surroundings

10.1.4 Sub-soil investigation

The Consultant will conduct sub-soil investigations of the site for construction. The investigation shall be supervised by the geotechnical specialist and the foundation engineer. Sub-soil investigation parties will conduct test boring and Standard Penetration Tests, and collect soil samples for laboratory tests to determine its bearing capacity. All tests must be carried out in BRTC at BUET.

This work component of the soil investigation includes:

- Selecting number and location of bore holes at site as per conducting Standard Penetration Test (SPT) at 5'-0"intervals.
- Collection of disturbed and undisturbed soil sample.
- Recording of groundwater table in each bore hole.
- Carrying out standard laboratory tests in **BRTC** at **BUET.**

Number of bore holes

Minimum number of bore holes will be determined based on the area under soil investigation with the conditions that each bore hole will be located at least 5'-0" intervals. There will be at least 10 nos. bore holes for the site and may increase depending on the size of the layout or results of certain bore holes. The depth of bore holes will vary depending on the subsoil structure but shall not be less than 150 feet and extend below compressible layers.

Investigation Report

Soil investigation report shall contain the details on the following particulars.

- Introduction.
- Purpose of the investigation.
- Scope of work.
- Site plan showing location of bore holes.
- Field investigation.
- Bore log.
- Laboratory analysis and charts.
- Evaluation of bearing capacity.
- Recommendation of the type of foundation for the structure.

The Consultant will submit 4-copies of the sub-soil report to the Client.

11. Preliminary Design and Documents

In preliminary phase of design and documentation the Consultant will carry out the following tasks:

- Identify the functional and floor space requirement for the purpose, including data center(s).
- Identify the type of structure viz. RCC Frame or Composite Frame.
- Determine orientation of the building and facilities to be incorporated for proper and efficient functioning of the building.
- Determine appropriate foundation design for construction of the building. The Consultant will have to do necessary soil investigation.
- Discuss and determine the features of underground and surface car parking.
- Develop alternative plan (architectural designs) for review and selection of the best plan
- Review various plans and designs for the building. Provide recommended design with detail cost estimates including Bill of Quantities (BOQ) and brief on cost effectiveness.
- Develop alternative plans and designs and recommend the best plan and design with detail justification in support of the recommended solution.
- Evaluate in detail all the alterative and assist to select the most effective functional plan.
- Incorporate any correction or change in plan.
- Estimate the electrical load and size and type of the electrical substations
- Prepare a master plan layout and landscaping drawing.
- Any other issues that are relevant for design development

12. Design Development Documents

From the approved preliminary drawing, the Consultant will prepare the design development documents that will consist of the following items:

- Master layout plan
- Plans and outlines specifications
- Size and character of the buildings
- Kind of materials
- Type of structure
- Mechanical and electrical systems
- Site development

- Gas, water supply and sewerage system
- Other external services
- Telecom and intercom systems
- Surface runoff drainage system
- Site accessibility with internal roads and boundary walls, security gates etc.

The methodology to be adopted in the design and development should be clearly mentioned.

12.1 Preparation of Final Architectural Drawings

After appraisal, review and revision of the preliminary designs the consultant will undertake preparation of the final architectural design with the following considerations:

- Optimum utilization of space
- Provision for future extension
- Conformity with existing structures
- Provision for utility spaces
- Climate and environmental considerations
- Data center(s) considerations
- Safety and social aspects
- Selected building materials consideration.

The design shall be studied in larger scale, in full depth and further developed incorporating all aspects of function, construction, finishes, utility services, fixtures, furnishing and equipment for all spaces. A 3-D scale model of external features will be constructed for display. The Architectural designed drawing shall include at least the following and necessary detailing there of

- Site plan, floor plan, all dimensions, doors, windows, schedule
- Four side ,elevation
- Blow up details, toilet and kitchen details
- Fire alarm, detection and fire-fighting system details
- Telephone lines details
- Electric line details
- Intercom line details
- Internet line details
- Sectional elevation, Sections through vertical circulations
- Basement floor details
- Door and window details

- Aluminum frame partition wall details.

All drawing should be duly signed and submitted within a presentable folder, It may be noted that the category of drawing will not however be limited to the above area but also the Consultant may need to provide more details other than this if situation demands or the Client's demands.

12.2 Preparation of Structural Design & Drawing

(a) On the basis of the approved architectural drawing by the Client, the Consultant shall prepare preliminary structural design of the proposed building along with design calculations for necessary approval from the Client.

(b) After getting approval of the preliminary structural design, the consultant shall prepare detailed structural design and drawing in sufficient details by incorporating necessary changes and corrections requested by the Client.

(c) Structural design/drawing shall at least include but not limited to the following:

- Bearing capacity of soil
- General Notes & specifications of all construction materials
- Ultimate strength for reinforcement, fy
- 28 days concrete strength, fc
- Clear covers, hooks, lapping, development length details
- Mix proportions
- Design Criteria/ Method (USD/WSD) and assumptions
- Sub-structure details
- Super structure details
- Bar bending schedules
- Wind load analysis as per latest BNBC

- Earth quake analysis details as per latest BNBC
- Trench Plan
- All design calculations in report form; and
- Standard Bangladesh National Building Code (BNBC)/Uniform Building Code (UBC)/ACI etc.

12.3 Preparation of Sanitary/Plumbing Design & Drawing

The consultant shall prepare the sanitary/Plumbs & design and drawing of the projects duly approved by the authority as per approved architectural drawling. They shall at least include but not limited to the following:

- Roof drainage plan
- Water supply and drainage Plan of the floor
- Detail of Pipelines
- Sewerage details
- Details of surface drains
- Layout and details of inspection pits and chambers
- Details of soil pipe
- Pipelines and Details of bathroom fittings and pipelines
- Detail rain water reservoir

12.4 Preparation of Electrical / Mechanical Design & Drawing

The Consultant shall prepare the internal & external electro-mechanical system design and drawing duly approved by the client for the project as per the approved architectural design & drawing. They shall include at least but not limited to the following:

- Layout plan fitting and fixtures (light, fan, exhaust fan, pin socket etc.);
- Position and size of Distribution Box, Sub-Distribution Box, circuit Breaker, Bus Bar Trucking;
- Cable line route with size;
- Laying of PVC pipe (concealed/surface);
- Earthling details;
- Site plan/layout plan showing HT/LT distribution line/Electric poles,
- Service Connections;
- Transformer with sub-station equipment including layout plan and detail with lightning arrester;

12.5 Preparation of Firefighting and Gas line Design & Drawing

The Consultant shall prepare the detail firefighting, gas line design and drawing which includes fire alarm, detection and fire-fighting system duly approved by the Client for the project on the basis of architectural working drawings.

12.6 Preparation of Lift Design & Drawing

The Consultant shall prepare the detailed design & drawing of Lift duly approved by the Client for the project on the basis of architectural working drawings.

13. Bill of Quantities (BOQ) and Cost Estimate

Schedule of items of work and bill of quantities and cost estimate will be prepared in details from the completed working drawings for each site separately. Bills of quantities will be prepared as per construction sequence. Market prices of building materials, current wages of skilled and unskilled laborers and transport costs will be obtained by the Consultant and used for computing item rates as per labour and material standards set by PWD for similar kinds of work suitable up dated by the Consultant as per requirement based on recent market rate. The items not covered by the PWD schedule will be analyzed as per current market prices of labour wages and materials. The unit rates for each item of work thus analyzed and prepared shall have the approval of the Client. Cost estimates of bid package shall be prepared by assembling item wise costs for all works in the package. Contracting of Project will be done based on the most updated cost estimates. The Consultant will submit 3 (three) sets of estimate to the Client for their approval.

14. Technical Specification

Detailed and precise technical specifications for construction works and materials are very important for effective quality control of all construction works. Detailed specifications will therefore be drawing for different items of construction works describing all works desired to be done by the Contractor under the item in sufficient detail so as to eliminate or minimize scope of misunderstanding or dispute between the Client and the Contractor and to ensure that the Client does not have to accept bad works of contractor because of any lapse or lacuna in the specifications.

Generally, detailed specification of any work will cover the following:

- Scope of work
- Materials specification
- Installation methods
- Applicable tests: mostly ACI, ASTM, Universal Building Code (UBC), Bangladesh National Building (BNBC), BSTI etc.
- Methods of measurements.

15. Bid Documents

Conditions of contract for the Contract dossier shall be so formed as to;

- Discourage unhealthy competition among Contractors
- Warn the Contractors that the Contract document would be followed strictly and faithfully

- Compel the Contractors to keep to the time schedule
- Inhibit the Contractor from resorting to unfair tactics such as making unreasonable claims for extra time or money.

The Contract Documents thus prepared, following ***ADB Procurement Guidelines, 2013***, will consist of:

- Form of contract Agreement
- General condition of contract
- Special condition of contract
- General Technical Requirements
- Technical Specification
- Terms of payments
- Final accepted price schedule & bill of quantities
- Time schedule for works
- Working Drawings

The Bidding documents including working drawings and the detailed cost estimates shall be submitted to the Client for their approval.

On receipt of the approval of these documents necessary copies of these documents shall be reproduced and forwarded to the Client for initiating Bidding process and for execution of the work of the project.

Ten (10) Sets of Working Drawing and Twenty (20) Sets of Bid documents for the Building shall be submitted to the Client.

16. Team Composition & Qualification Requirements for the Key Experts

The Consultant shall provide sufficient and qualified personnel for the project. The estimated inputs of the personnel for the design phase is 76 person-months The international inputs are estimated at 9 person-months and national inputs are estimated at 67 person-months in Phase I. The Team of Key Experts of the firm is given in **Table 1** below:

Table 1: Summary of Key Experts Inputs

Sl. No.	Positions	Person-months	Remarks
FS	**Phase I: Feasibility Study, Design & Drawing**		
International Experts			
I-1	Senior Architect/ Team Leader (International)	3	Spread-over 12 months

Sl. No.	Positions	Person-months	Remarks
I-2	Senior Structural Design Engineer (International)	3	Spread-over 12 months
I-3	Senior Foundation Design Engineer (International)	3	Spread-over 12 months
National Experts			
N-1	Deputy Team Leader/Project Manager	11	Spread-over 12 months
N-2	Architect	6	Spread-over 12 months
N-3	Structural Design Engineer	6	Spread-over 12 months
N-4	Foundation Design Engineer	6	Spread-over 12 months
N-5	Mechanical Design Engineer	6	Spread-over 12 months
N-6	Electrical Design Engineer	6	Spread-over 12 months
N-7	Sanitary and Plumbing Engineer	6	Spread-over 12 months
N-8	Quantity Engineer	5	Spread-over 12 months
N-9	ICT Expert	5	Spread-over 12 months
N-10	Socio-Environmental Expert	5	Spread-over 12 months
N-11	Procurement Expert	5	Spread-over 12 months
	Total for Phase I	**76**	

The detailed TORs of the individual experts are given in the following paragraphs:

Phase I: International Positions

I-1 Senior Architect/Team Leader (International); 1x 3 person months:

Minimum bachelor degree in Architecture from any recognized university with fifteen (15) years of working experience. Relevant master degree will be considered as added advantage. Should have specific experience in architectural design of high-rise buildings including international relevant experience and also having 2 years of experience in similar leadership position. Relevant professional certification/Training will be considered as added advantage. He/She shall be responsible for:

- Act as the Team Leader for the assignment
- Act as in-charge of Architectural Design Team
- Review and analyze different options for the high-riser from the perspective of technical and economical justifications for recommendation
- Assist planning on preparation of project brief along with Team Leader,
- Preparation of project concept taking into account the Client's perceptions of the requirements;

- Design consultation with the Client;
- Preparation of functional layout of each facility;
- Design development drawings;
- Recommend on architectural features of proposed works;
- Co-ordinate all architectural working drawings;
- Check detail specification of works;
- Any and all other works necessary for proper consultancy services.

I-2 Senior Structural Design Engineer (International); 1x 3 person months:

Minimum bachelor degree in Civil/Structural Engineering from any recognized university. Relevant master degree will be considered as added advantage. Should have fifteen (15) years of proven experience in civil/structural design work of which at least five (5) years particularly in multi-storied high-rise earthquake resistant building design including international relevant experience and structural drawing development. Relevant professional certification/Training will be considered as added advantage. He/she shall be responsible for;

- Consulting and Collaborating with Architects
- Compliance with BNBC and other codes
- Using appropriate design tools and applied engineering concepts, structural engineer calculates the estimated impact of external forces such as wind, seismic movements, and internal forces such as furniture load and human occupancy.
- Detailed Structural Design calculation using the appropriate design tools.
- Description in details of design calculation.

I-3 Senior Foundation Engineer (International); 1x 3 person months:

Minimum bachelor degree in Civil/Foundation Engineering from any recognized university. Relevant master degree will be considered as added advantage. Should have fifteen (15) years of proven experience in foundation design of civil engineering heavy structure of which at least five (5) years particularly in foundation design of multi-storied high-riser building in soft soil including design and drawing development with relevant international experience. Relevant professional certification/training will be considered as added advantage.

He/she shall assist the Senior Structural Design Engineer with the design development of Foundation for the multi-storied Building and as well support:

- Fixing foundation design criteria for the structural system to be adopted for the project;
- Assist in formulating criteria, preparing design calculations, and design analysis;
- Design and drawing development for foundation
- Any and all other works necessary for proper consultancy.

Phase I: National Positions

N-1 Deputy Team Leader /Project Manager (National); 1x 11 person months:
Minimum bachelor degree in Civil Engineering from any recognized university with twenty (20) years of working experience in engineering study and design, and worked as Project Manager/ similar leadership position in at least two projects of similar nature. Relevant master degree or professional certification/training will be considered as added advantage. He/She shall be responsible for:

- Coordinate with all experts in the consultant's team and represent the consultant under the guidance of the Team Leader;
- Be involved key decisions making when key decision are expected to be taken or issues to be resolved.
- Overall responsibility for topographic survey, Subsoil investigation, architectural and structural design, preparation of the cost estimate and BOQ of the Project
- Overall management, monitoring and control of project activities of the Consultancy works;
- Technical guidance of project and project administration;
- Implement mobilization of the consultant's personnel and physical resources;
- Coordinate all services to be rendered by the Consultants;
- Maintain liaison with the Client;
- Review the project status on a continuing basis;
- Control work schedules and time schedules to ensure timely completion of the consultancy services;
- Prepare a Temporary Relocation Plan for existing DSHE resources to be operationally accommodated during the construction phase.
- Assign project personnel and replace such staff, if required;
- Manage and guide all technical staff assigned for conducting the consultancy services;
- Prepare and submit progress reports;
- Prepare the Final report of the consultancy services

N-2 Architect (National); 1x6 person months:

Minimum bachelor degree in Architecture from any recognized university with ten (10) years of working experience in architectural design and worked as Architect in at least in one project of similar nature. Relevant master degree or professional certification/training will be considered as added advantage. He/She shall be responsible for:

- Work with Senior Architect to produce detail architectural design
- Design development of door, window and other architectural features.
- Prepare landscape drawing
- Prepare detail master plan
- Assist Sr Architect in all other matters

N-3 Structural Design Engineer (National); 1x 6 person months:

Minimum bachelor degree in Civil/structural Engineering from any recognized university with ten (10) years of proven experience in foundation design of civil engineering heavy structure and, worked as such at least in one project of similar nature in structural design of multi-storied high-riser including design and drawing development. Relevant master degree or professional certification/training will be considered as added advantage.

He/she shall assist the Senior Structural Design Engineer with the design development of the Structure for the multi-storied Building and as well support,

- Consulting and Collaborating with Architects
- Compliance with BNBC and other codes
- Using appropriate design tools and applied engineering concepts, structural engineer calculates the estimated impact of external forces such as wind, seismic movements, and internal forces such as furniture load and human occupancy.
- Detailed Structural Design calculation using the appropriate design tools.
- Description in details of design calculation.

N-4 Foundation Engineer (National); 1x 6 person months:

Minimum bachelor degree in Civil/Foundation Engineering from any recognized university with ten (10) years of proven experience in foundation design of civil engineering heavy structure and, worked as such at least in one project of similar nature in foundation design of multi-storied high-riser including design and drawing development. Relevant master degree or professional certification/training will be considered as added advantage.

He/she shall assist the Senior Foundation Engineer with the design development of Foundation for the multi-storied Building and as well support,

- Fixing foundation design criteria for the structural system to be adopted for the project;
- Assist in formulating criteria, preparing design calculations, and design analysis;
- Design and drawing development for foundation

- Any and all other works necessary for proper consultancy.

N-5 Mechanical Design Engineer (National); 1x6 person months:

Minimum bachelor degree in Mechanical Engineering from any recognized university with ten (10) years of proven experience in mechanical design of civil engineering building complex and, worked as such at least in one project of similar nature in mechanical design of multi-storied high-riser including design and drawing development. Relevant master degree or professional certification/training will be considered as added advantage.

He/she shall assist the Senior Structural/Foundation Engineer with the design development of mechanical installations for the multi-storied Building and as well support,

- Ascertain mechanical requirements for the project;
- Design mechanical installations for the project;
- Prepare drawings for mechanical installations system for the project;
- Carry out all types of mechanical survey works at site;
- Prepare specifications and bill of quantities of mechanical systems;
- Prepare cost estimates of mechanical systems;
- Any and all other works necessary for proper consultancy.

N-6 Electrical Design Engineer (National); 1x6 person months:

Minimum bachelor degree in Electrical Engineering from any recognized university with ten (10) years of proven experience in electrical design of civil engineering building complex and worked as such at least in one project of similar nature in electrical design of multi-storied high-riser including design and drawing development. Relevant master degree or professional certification/training will be considered as added advantage.

He/she shall assist the Senior Structural/Foundation Engineer with the design development of electrical installations for the multi-storied Building and as well support,

- Ascertain electrical requirements for the project
- Estimate electrical load requirement for the project;
- Design Electrical substation for the project;
- Design and prepare drawings of electrical internal and external electrical distribution system for the project including service line from the source supply;
- Carry out all types of electrical survey works at site;
- Prepare specifications and bill of quantities of electrical systems;
- Prepare cost estimates of electrical systems;

- Any and all other works necessary for proper consultancy.

N-7 Sanitary & Plumbing Engineer (National); 1x6 person months:

Minimum bachelor degree in Civil Engineering from any recognized university with ten (10) years of proven experience in sanitary and plumbing design works of civil engineering building complex and, worked as such at least in one project of similar nature in sanitary and plumbing design of multi-storied high-riser including design and drawing development. Relevant master degree or professional certification/training will be considered as added advantage.

He/she shall assist the Senior Structural Design/Foundation Engineer with the design development of sanitary and plumbing network distribution and installations for the multi-storied Building and as well support,

- Design and prepare drawings of sanitary & plumbing system for the project;
- Carry out all types of sanitary & plumbing survey works at site;
- Prepare specifications and bill of quantities of sanitary & plumbing systems;
- Prepare cost estimates of sanitary & plumbing systems;
- Any and all other works necessary for proper consultancy.

N-8 Quantity Engineer (National); 1x5 person months:

Minimum Diploma in Civil Engineering from any recognized Polytechnic Institute with fifteen (15) years of working experience in estimating civil, electrical, mechanical, sanitary and plumbing design works of civil engineering building complex and, worked as such at least in one project of similar nature in quantity survey and estimation of items of works in a multi-storied high-riser including preparation of the Bill of Quantities in sequence of construction and, as well support,

- Understanding every details of the engineering designs and drawings
- Drawing Technical specifications of the items of works from PWD standards or as specified by the designers in the drawings
- Prepare the engineering estimates of quantity and costs of each and every item of works
- Prepare the Bill of Quantities (BOQ) for incorporation in the Bidding Document
- Any and all other works necessary for proper consultancy.

N-9 ICT Expert (National); 1x5 person months:

Minimum Diploma in Computer Science/ Information and Communication Technology (ICT) from any recognized Institute with ten (10) years of working experience in design of all types of networking, communicating and computerizing the functionalities of a building or a complex in facilitating the process of digitization and, as well support,

- Ascertain the ICT requirements for the project

- Prepare the Lay-out plan and design as required for all ICT activities functionalities

N-10 Socio-Environmental Expert (National); 1x5 person months:

Minimum Master degree in Sociology/Social Science/Environmental Science/Environmental Engineering subject from any recognized university with ten (10) years of working experience in social and environmental aspects in development partner funded projects and, worked as such at least in one project of similar nature in preparing the Environmental Impact Assessment and incorporation of Social dimensions in the feasibility study and design of the project and, as well support, Relevant professional certification/training will be considered as added advantage.

- Identify the social dimensions in the perspective of gender and inclusive aspects required for project design
- Prepare an Environmental Impact Assessment (EIA) required for clearance in project design and implementation.

N-11 Procurement Expert (National); 1x5 person months:

Minimum bachelor degree in any relevant subject from any recognized university with ten (10) years of working experience in procurement planning, management and implementation in development partner funded projects and, worked as procurement expert in at least in one project of similar nature in preparation of Bidding Document, Invitation of Bids, Evaluation of Bids, Selection of Bidder using ADB Procurement Guidelines and ADB or World Bank's Standard Bidding Documents. Relevant master degree or professional certification/training will be considered as added advantage.

- Undertake the necessary procurement activities and tasks as determined and needed

In addition to the key experts mentioned above, the consultant would also require other professionals/experts/technicians as well as support staffs necessary for implementation of the aforesaid tasks/ activities. The consultant's proposal shall include all these personnel in sufficient number having adequate qualifications. However, non-key and support staffs will not be evaluated individually.

17. Reporting and Other Deliverables

The list of main deliverables by the Consulting Firm is summarized in **Table 2.** Other occasional deliverables maybe required from time to time on an informal basis. The reports will be submitted to the Joint Project Director (JPD) in general five (5) copies and, in particular, as determined on case-by-case basis. Final reports shall be delivered in CD ROM in addition to the specified number of hard copies.

Table 2: List of Deliverables

No.	Output	Description	Due Time*
	Feasibility Study, Design and Drawing		
1	Inception Report	Confirmation, elaboration and adjustment of the consultants approach and methodology based on information received during the inception phase. Detailed plan of the consultant's activities and confirmation and adjustment to the tasks of each expert with further elaboration as required. Detailed implementation plan for the project's activities. Issues identified during the inception phase.	1
2	Draft Final Report	Summary of the program and progress highlighting the physical and financial aspects and the problems and bottlenecks encountered and resolved.	10
3	Final Report	Comments, approval and all other aspects covering the design and construction phases during the consultancy services.	12
4	Monthly Reports	Concise mainly tabular report with 10 page maximum summarizing monthly progress of the program, implementation status and highlighting any critical issues that require GOB or ADB support with recommendations for resolution. The Inception Report will serve as Month 1 report	2-12
5	Briefing Reports	Special briefing reports as requested by the EA and/or ADB	As required

**months from commencemen /start date*

18. Client's Inputs and Counter-part Personnel

(a) Services, facilities and property to be made available to the Consultant by the Client:

None

(b) Professional and support counterpart personnel to be assigned by the Client to the Consultant's team:

Executive Engineer-1 and Assistant Engineer- 2