

TERMS OF REFERENCE (TOR)

DESIGNING OF CIVIL (ARCHITECTURAL AND STRUCTURAL) AND ELECTRICAL WORKS INCLUDING COST ESTIMATION FOR G+2 RESIDENTIAL BUILDING

Client: Drukair Office, Paro

Location: Paro, Bhutan

1. BACKGROUND

Drukair Office, Paro intends to undertake the construction of a G+2 Residential Building at Trashigang Yonphula to accommodate the residential requirements of its staff and personnel. In order to ensure that the proposed building is functionally appropriate, structurally safe, aesthetically suitable, cost-effective, and compliant with applicable building requirements, it is proposed to engage a qualified and experienced consultant/consultancy firm to undertake the complete design and preparation of drawings and cost estimates.

The assignment shall cover the preparation of civil/architectural, structural, and electrical designs, together with detailed drawings, design calculations, technical specifications, Bill of Quantities (BoQ), detailed cost estimate, and other relevant documents required for implementation of the proposed building.

The consultant shall ensure that the proposed design complies with applicable Bhutanese building rules and regulations, building codes, structural safety requirements, electrical standards, fire and life safety requirements, accessibility provisions, planning requirements, and other relevant government standards and guidelines.

The assignment is intended to provide Drukair Office, Paro with a complete and coordinated design package suitable for obtaining necessary approvals, procurement/tendering, and subsequent construction of the proposed G+2 Residential Building.

2. OBJECTIVE

The main objective of the assignment is to engage a competent consultant/consultancy firm to provide complete professional design services for the proposed G+2 Residential Building, including architectural, structural, electrical design, and detailed cost estimation.

The specific objectives are to:

1. Develop a functional, safe, economical, and aesthetically appropriate architectural design.
2. Prepare complete structural designs to ensure the stability, strength, durability, and safety of the building.
3. Prepare a comprehensive electrical design suitable for the proposed residential building.
4. Prepare coordinated architectural, structural, and electrical drawings.
5. Prepare detailed Bill of Quantities (BoQ) and cost estimates based on the approved design.



6. Ensure compliance with applicable Bhutanese building codes, regulations, standards, and approval requirements.
7. Provide complete technical documentation required for procurement/tendering and construction.
8. Incorporate appropriate provisions for safety, accessibility, energy efficiency, maintainability, and climate resilience.

3. OVERALL TASK

The consultant shall undertake all necessary professional services for the planning, design, documentation, and cost estimation of the proposed G+2 Residential Building.

The overall assignment shall include, but not be limited to, the following:

- Review of the site information and available documents provided by Drukair Office, Paro.
- Site inspection and verification of existing site conditions.
- Review of the functional requirements of the proposed residential building.
- Development of architectural concept and detailed building design.
- Preparation of floor plans, elevations, sections, roof plans, and other architectural drawings.
- Preparation of structural analysis and design for the proposed building.
- Preparation of structural foundation, column, beam, slab, staircase, roof/truss and other structural drawings as applicable.
- Preparation of electrical layout and electrical load calculations.
- Preparation of lighting, power outlet, distribution board, earthing, and other electrical layouts.
- Coordination of architectural, structural, and electrical components.
- Preparation of detailed technical specifications.
- Preparation of detailed Bill of Quantities.
- Preparation of detailed cost estimate based on the latest applicable BSR and prevailing market rates, where applicable.
- Preparation of tender drawings and technical documents.
- Incorporation of comments and revisions provided by Drukair Office, Paro.
- Provision of technical clarification related to the design during the approval and procurement/tendering stage, where required.

4. SPECIFIC TASKS AND PROPOSED METHODOLOGY

4.1 Site Assessment and Data Collection

The consultant shall:

- Visit and inspect the proposed project site.
- Verify the site dimensions, access, existing ground conditions, surrounding development, utilities, and other relevant site conditions.



- Review any available topographical survey, land documents, site plans, or other information provided by Drukair Office, Paro.
- Identify site constraints that may influence the building design.
- Verify the proposed building footprint and site access requirements.
- Assess requirements for drainage, water supply, sewerage, electrical connection, and other relevant services.
- Identify any existing structures, services, or utilities that may affect the proposed development.

4.2 Architectural Design

The consultant shall prepare a complete architectural design based on the functional requirements and instructions of Drukair Office, Paro.

The architectural design shall include:

- Site development plan.
- Ground floor plan.
- First floor plan.
- Second floor plan.
- Roof plan.
- All necessary elevations.
- Building sections.
- Door and window schedules.
- Staircase details.
- Room layouts and dimensions.
- Floor and wall finish schedules.
- Toilet and kitchen layouts.
- Furniture layout, where required.
- External works and site development details, where applicable.
- Accessibility provisions.
- Fire and life safety provisions.
- Appropriate architectural detailing and finishes.

4.2.1 Ground Floors

The ground floor shall generally comprise four (4) residential units, unless otherwise revised and approved by the Employer based on site and planning requirements.

Each unit shall comprise:

- Two (2) bedrooms;
- Two (2) toilets/bathrooms;
- Living room;
- Kitchen;
- Suitable circulation spaces; and
- Appropriate storage/utilitarian spaces, where feasible.

4.2.2 First Floor



The First floor shall generally comprise four (4) residential units, unless otherwise revised and approved by the Employer based on site and planning requirements.

The two units shall comprise:

- Two (2) bedrooms;
- Two (2) toilets/bathrooms;
- Living room;
- Kitchen;
- Suitable circulation spaces; and
- Appropriate storage/utilitarian spaces, where feasible.

The one unit shall comprise:

- Three (3) bedrooms
- Two (2) master bedrooms
- One (01) common toilet/bathroom
- Living Room
- Kitchen
- Suitable circulation spaces; and
- Appropriate storage/utilitarian spaces, where feasible

4.2.3 Top Floor

The top floor shall generally comprise:

- a) Individual rooms with attached toilets; and
- b) One large common hall with kitchen-cum-dining facilities.

The final arrangement, room sizes, circulation, and functional requirements shall be optimized by the Consultant and submitted to the Employer for approval.

The consultant shall propose an architectural solution that is functional, economical, climate-responsive, and appropriate to the local context.

4.3 Structural Design

The consultant shall undertake structural analysis and design of the complete building.

The structural works shall include, as applicable:

- Structural design criteria and design basis.
- Foundation system.
- Columns.
- Beams.
- Slabs.
- Staircases.
- Retaining structures, where required.
- Roof structure.
- Other structural elements required for the building.
- Structural connections and detailing.



- Seismic considerations in accordance with applicable Bhutanese requirements and relevant structural standards.

The consultant shall provide structural calculations and design documentation demonstrating the adequacy, stability, strength, serviceability, and safety of the proposed structural system.

4.4 Electrical Design

The consultant shall prepare a complete electrical design for the proposed building, including:

- Electrical load calculations.
- Lighting layout.
- Power outlet layout.
- Distribution board layout.
- Single-line diagram.
- Cable and wiring schedule.
- Circuit schedule.
- Electrical protection system.
- Earthing system.
- Lightning protection, where required.
- External electrical connection requirements.
- Emergency lighting provisions where applicable.
- Internet/data and other low-voltage system provisions where required.
- Electrical equipment and material specifications.

The electrical design shall ensure safety, reliability, energy efficiency, ease of maintenance, and compliance with applicable electrical standards and requirements.

4.5 Coordination of Designs

The consultant shall ensure that all architectural, structural, and electrical drawings are fully coordinated.

Particular attention shall be given to:

- Electrical conduits and structural members.
- Electrical distribution boards and room layouts.
- Staircases and structural components.
- Plumbing/service openings, where relevant.
- Ceiling and lighting arrangements.
- Equipment locations.
- Accessibility and maintenance requirements.

Any clashes or inconsistencies identified during the design process shall be resolved before submission of the final drawings.

4.6 Cost Estimation and Bill of Quantities

The consultant shall prepare a detailed cost estimate and BoQ based on the final approved design.

The cost estimation shall include, as applicable:

- Site development works.



- Earthwork.
- Foundation works.
- Reinforced concrete works.
- Masonry works.
- Roofing works.
- Doors and windows.
- Floor, wall, and ceiling finishes.
- Painting works.
- Sanitary and plumbing works, where included in the assignment.
- Electrical works.
- External works.
- Other associated works.

The cost estimate shall be prepared using the latest applicable Bhutan Schedule of Rates/BSR and supplemented by prevailing market rates where required and justified.

The BoQ shall clearly indicate:

- Item description.
- Unit.
- Quantity.
- Rate.
- Amount.
- Applicable specifications/reference.

4.7 Technical Specifications

The consultant shall prepare technical specifications for all major works and materials included in the design and BoQ.

The specifications shall clearly define:

- Material requirements.
- Workmanship requirements.
- Applicable standards.
- Testing requirements.
- Quality requirements.
- Installation requirements.
- Measurement and payment requirements, where appropriate.

4.8 Review and Revision

The consultant shall submit the draft design package to Drukair Office, Paro for review.

The consultant shall incorporate reasonable comments and observations provided by Drukair Office, Paro and submit revised drawings/documents as required.

5. DELIVERABLES

The consultant shall submit the following deliverables:

A. Architectural Deliverables



1. Site development plan.
2. Complete floor plans.
3. Roof plan.
4. Elevations.
5. Building sections.
6. Door and window schedules.
7. Staircase details.
8. Finishing schedules.
9. Detailed architectural drawings.
10. Other architectural details necessary for construction.

B. Structural Deliverables

1. Structural design basis.
2. Structural analysis and design calculations.
3. Foundation layout and details.
4. Column layout and reinforcement details.
5. Beam layout and reinforcement details.
6. Slab layout and reinforcement details.
7. Staircase structural details.
8. Roof structural drawings.
9. Other structural details necessary for construction.

C. Electrical Deliverables

1. Electrical load schedule.
2. Lighting layout.
3. Power outlet layout.
4. Distribution board layout.
5. Single-line diagram.
6. Earthing layout.
7. Lightning protection layout, where applicable.
8. Cable/wiring schedule.
9. Electrical specifications.
10. Other relevant electrical drawings.

D. Cost and Tender Documents

1. Detailed Bill of Quantities.
2. Detailed cost estimate.
3. Rate analysis for major/non-standard items, where applicable.
4. Technical specifications.
5. Tender drawings.
6. Design report.
7. Summary of project cost.
8. Soft copies of all drawings and documents.



All drawings shall be submitted in AutoCAD/DWG and PDF formats. Design calculations, BoQs, and cost estimates shall be submitted in editable electronic formats in addition to PDF.

6. REPORTING REQUIREMENTS

The consultant shall report directly to the designated representative/focal person of Drukair Office, Paro.

The consultant shall:

1. Submit an inception report outlining the proposed methodology, work programme, and design approach.
2. Maintain regular communication with Drukair Office, Paro throughout the assignment.
3. Attend coordination and review meetings as required.
4. Submit draft drawings and documents for review before finalization.
5. Incorporate comments provided by Drukair Office, Paro.
6. Submit a final design report and complete design package upon completion.
7. Promptly notify Drukair Office, Paro of any technical issue, site constraint, or design matter that may affect the project cost, quality, or implementation schedule.

7. QUALIFICATIONS AND CRITERIA

7.1 Consultancy Firm

The consulting firm should:

- Be legally registered and authorized to provide architectural/engineering consultancy services in Bhutan.
- Have relevant experience in building design and consultancy services.
- Demonstrate experience in architectural, structural, electrical design, and cost estimation.
- Have adequate qualified technical personnel.
- Have experience in preparing tender-ready drawings, BoQs, specifications, and cost estimates.
- Have access to appropriate design software and technical resources.

7.2 Key Professional Personnel

The proposed team should include, as a minimum:

a. Team Leader/Architect

- Bachelor's degree or higher in Architecture or relevant field.
- Registered with the relevant professional authority in Bhutan, where applicable.
- Relevant experience in building design.
- Experience in similar residential/institutional building projects is desirable.

b. Structural Engineer

- Bachelor's degree or higher in Civil/Structural Engineering.
- Relevant professional registration, where applicable.
- Demonstrated experience in structural analysis and design of multi-storey buildings.
- Knowledge of applicable Bhutanese and international structural standards.



c. Electrical Engineer

- Bachelor's degree or higher in Electrical Engineering or relevant field.
- Relevant professional registration, where applicable.
- Experience in electrical design of residential/multi-storey buildings.
- Knowledge of applicable electrical standards and safety requirements.

d. Quantity Surveyor/Cost Estimator

- Relevant degree/diploma in Quantity Surveying, Civil Engineering, or related field.
- Demonstrated experience in preparation of BoQ and detailed cost estimates.
- Familiarity with Bhutanese Schedule of Rates/BSR and construction market rates.

The consultancy firm shall be evaluated based on its technical capability, relevant experience, qualifications of proposed personnel, similar assignments undertaken, methodology, work programme, and financial proposal, as applicable to the procurement method adopted by Drukair.

8. LENGTH AND TIME FRAME OF THE ASSIGNMENT

The total duration of the assignment shall be 45 calendar days from the date of signing of the contract or issuance of the Notice to Proceed.

The indicative work programme shall be as follows:

Sl. No.	Activity	Indicative Duration
1	Site visit, data collection and review	5 days
2	Conceptual architectural design	7 days
3	Detailed architectural design	10 days
4	Structural analysis and design	15 days
5	Electrical design	7 days
6	Preparation of BoQ and cost estimate	7 days
7	Preparation of specifications and tender documents	5 days
8	Review, coordination and finalization	5 days

The above activities may be undertaken concurrently where practical, provided that the final design package is properly coordinated and submitted within the agreed contract period.

Any extension of time shall be subject to approval by Drukair Office, Paro and in accordance with the terms and conditions of the contract.

9. OTHER RESOURCES / COUNTER FACILITIES

Drukair Office, Paro shall, to the extent available, provide the consultant with:

1. Available site information and relevant land/site documents.
2. Existing site plans or survey information, if available.
3. Relevant project requirements and functional requirements.
4. Access to the project site for inspection and verification.
5. Available existing utility information.



6. Relevant government standards, guidelines, and requirements available with Drukair Office, Paro.
7. A designated focal person for coordination and communication.
8. Review and comments on submitted design documents within a reasonable period.

The consultant shall be responsible for providing all necessary personnel, design software, computers, surveying/design equipment, transportation, printing, and other resources required to complete the assignment unless otherwise specified in the contract.

10. ANY OTHER INFORMATION(S)

10.1 Compliance with Standards

The consultant shall ensure that all designs comply with applicable:

- Bhutan Building Rules and Regulations.
- Bhutan Building Code and relevant technical standards.
- Applicable structural design standards.
- Applicable electrical standards and safety requirements.
- Fire and life safety requirements.
- Accessibility requirements.
- Environmental and climate-resilience considerations.
- Relevant government rules, regulations, guidelines, and directives.

Where a specific Bhutanese standard is not available, appropriate internationally recognized standards may be adopted with prior approval of Drukair Office, Paro.

10.2 Design Quality and Economy

The consultant shall ensure that the proposed design is:

- Structurally safe.
- Functionally appropriate.
- Cost-effective.
- Durable and maintainable.
- Energy efficient where practicable.
- Climate responsive.
- Suitable for local construction conditions.
- Compatible with the surrounding built environment.

10.3 Ownership of Documents

All drawings, calculations, reports, specifications, BoQs, estimates, digital files, and other documents prepared under this assignment shall become the property of Drukair Office, Paro upon completion and payment in accordance with the contract.

The consultant shall not reproduce, distribute, or use the project documents for purposes unrelated to the assignment without prior written approval from Drukair Office, Paro.

10.4 Confidentiality



The consultant shall maintain confidentiality of all project-related information and documents and shall not disclose such information to any third party without prior approval from Drukair Office, Paro, except where disclosure is required by law.

10.5 Design Revisions

The consultant shall incorporate reasonable revisions arising from Drukair Office, Paro's review and coordination requirements within the agreed scope of services without additional cost, unless such revisions constitute a substantial change in scope.

10.6 Professional Responsibility

The consultant shall be professionally responsible for the accuracy, completeness, coordination, and technical adequacy of the submitted designs, drawings, calculations, specifications, BoQs, and cost estimates.

Any errors, omissions, inconsistencies, or design coordination issues identified within the consultant's scope shall be rectified by the consultant at no additional cost to Drukair Office, Paro, subject to the terms and conditions of the contract.

11. MODE OF PAYMENT

Payment to the consultant shall be made based on the satisfactory completion and acceptance of the specified deliverables/milestones by Drukair Office, Paro.

The proposed payment schedule shall be as follows:

Sl/No	Milestone/Deliverable	Payment
1	Upon signing of the contract and submission/acceptance of the Inception Report, detailed work programme, methodology, and site assessment report	20%
2	Upon submission and acceptance of the preliminary/final architectural design, including floor plans, elevations, sections, site development plan, and architectural drawings	25%
3	Upon submission and acceptance of the complete structural and electrical designs, including structural calculations, structural drawings, electrical layouts, load schedule, and single-line diagram	25%
4	Upon submission and acceptance of the complete BoQ, detailed cost estimate, technical specifications, and draft tender documents	20
5	Upon submission and acceptance of the final coordinated design package incorporating all comments and revisions from Drukair Office, Paro	10%
	Total	100%



11.1 Conditions for Payment

1. Payment shall be made only after satisfactory completion and acceptance of the respective deliverables by Drukair Office, Paro.
2. The consultant shall submit an invoice along with the required supporting documents for each payment milestone.
3. Drukair Office, Paro shall review the submitted deliverables and may request necessary corrections, clarifications, or revisions before approving the corresponding payment.
4. No additional payment shall be made for corrections of errors, omissions, inconsistencies, or coordination issues attributable to the consultant.
5. Any applicable taxes, duties, withholding tax, or other statutory deductions shall be deducted from the consultant's payment in accordance with the applicable laws and regulations of Bhutan.
6. Payment shall be processed in accordance with the applicable financial rules, procedures, and contractual provisions of Drukair.
7. The final 10% payment shall be released only upon submission and acceptance of the complete final design package in both hard copy and editable electronic formats, including all drawings, calculations, specifications, BoQ, cost estimate, and other required documents.
8. The payment schedule may be modified by Drukair Office, Paro, in consultation with the consultant, depending on the final scope of work and contractual arrangements.

12. EXPECTED OUTCOME

At the completion of the assignment, Drukair Office, Paro shall receive a complete, coordinated, and construction-ready design package for the proposed G+2 Residential Building, comprising:

- Architectural drawings.
- Structural drawings and calculations.
- Electrical drawings and calculations.
- Detailed Bill of Quantities.
- Detailed cost estimate.
- Technical specifications.
- Tender drawings and documents.
- Design report.



- Editable electronic files.
- PDF copies of all final documents.

The final design package shall be sufficiently detailed and coordinated to facilitate the necessary approvals, procurement/tendering, and subsequent construction of the proposed G+2 Residential Building.

