Terms of Reference

**Consultancy for a Structural Engineer to design a pressed steel elevated water tank, complete with reinforced concrete foundation and steel tower in Bentiu, Unity State, South Sudan.**

**Post Title**: Consultant, Structural Engineer

**Program Title**: GAC/BHA

**Reporting to**: WASH Programme Manager

**Duration**: 15 days

**Starting date**: As soon as possible

1. **Background**

About 1.86 million people have been internally displaced across South Sudan, including over 215,000 seeking shelter in the Protection of Civilians Sites of the United Nations Mission in South Sudan (UNMISS). Recent[[1]](#footnote-1) head count reports shared by International Organization for Migration (IOM) camp management shows over 107,130 IDPs reside in the now IDP camp, in Bentiu, Unity State.

Concern began working in Unity State in January 2014 in response to the 2013 political crisis with the support of donors such as USAID/BHA, UNICEF, and DFATD/GAC. As people fled to Bentiu PoC[[2]](#footnote-2), Concern’s team established WASH, Shelter/NFI, FSL and nutrition activities in the PoC, expanding these humanitarian services to underserved as part of the Beyond Bentiu Response

**Project Site**

In partnership with State Ministry of Lands, Housing and Public Utilities (SMoLHPU), Concern operates two water systems within Rubkona and Bentiu. The systems are conventional type and temporary surface water treatment (SWAT), with a design capacity of about 400 and 440 m3 per day respectively. Due to increasing water demand within the two towns for both institutional, communal and individual connections, there is need to increase of storage and pressures within the network system. Concern has undertaken hydraulic modeling of the water network systems of the two towns. One of the recommendation was to increase water storage through having additional elevated tanks. Following the recommendation, Concern secured additional funds and undertook geotechnical investigations at the proposed locations for construction of the tanks. Based on design demand, 2 number pressed steel elevated tanks on steel towers is proposed to be constructed. The tanks capacity is 50m3 each on a 15 meters high steel tower. The purpose of the additional tanks is to augment the storage capacity of the system which currently consists of 2 tanks of capacity 22.5m3 mounted onto 9 meters high elevated steel tower. The current system serves schools, health facilities, state government offices, humanitarian offices and community living within the town and its’ adjacent.

**Geology**

Generally, the basement complex of South Sudan includes Igneous, Metamorphic and Sedimentary rocks that overlain by horizontal and sub horizontal Paleozoic or Mesozoic sedimentary or igneous rocks. According to the geological map of the area, the general project area belongs to the Lower Proterzoic remobilized ensiallic continental basement rocks represented by the undifferentiated metamorphic rock (PLu), Migmatite (PLt) and Gneiss (PLg). The rock are showed out crop north eastern side from the site approximately 70.0km,

Studies indicate that only sedimentary black cotton and fine sand extend to more than 100.0m thickness laying above the basement rock it was distinguished within the study area. This black cotton is consist of clay/ silt and fine sand with trace of fine gravel.[[3]](#footnote-3)

Water resources of the region is composed of

* Rainfall
* Surface water (perennial)
* Ground water (potential yields of about 43 – 86m3/hr when drilled at a depth of about 150m)[[4]](#footnote-4)

**General objective:**

To carry out detailed analysis and design of foundation, substructure and superstructure work for 2. pressed steel elevated water tanks (capacity 50m3 each) and steel towers of height 15 meters from the ground level to the base of the tank.

Tasks and responsibilities:

* Read and understand all the guiding documents (geotechnical report3, hydraulic modeling report4) referenced in this ToR for the purposes of the design.
* Interpret and define the needs of the specified works. Identify any special design criteria such as necessary equipment, as well as other specific requirements and shall advise the WASH Programme Manager accordingly;
* The Consultant together with Concern is responsible for setting out a written description of the scope of the construction so as to meet the design criteria and shall use geotechnical report conducted within the area for purposes of reviewing requirements for the tank construction;
* The tank must be designed to withstand the maximum gravity, wind stresses, rain, vibrations, floods, and ensuring safety of the structure to withstand all forces acting on it. Design, calculation and drawings shall follow British Standards.
* Provision of detailed calculation note and design considerations.
* Provision of detailed technical drawings for the foundations, superstructure, the drainage, special foundation measures, safe slopes, shoring requirements and any other key sections for purposes of construction of the pressed steel elevated tank. Provision of special clauses to be included in the specifications to the contractor’s contract and preparation and provision of final bidding documents (including Bills of Quantities, technical drawings and technical specifications).

**Concern’s duties**

* Provide timely information in sufficient detail as required by the Consultan*t*  to adequately perform his/her duties;
* Quality Assurance of the entire process;

Concern will perform a quality assurance review of the consultant’s work to confirm that proper criteria, regulations, laws, codes, principles and professional procedures have been adhered. Concern will also review the work of consultant during each stage and return comments in writing.

**Methodology:**

Using geotechnical and hydraulic modeling reports provided by the Client and any other related technical literature materials. Design, calculation and drawings shall follow British Standards.

The Consultant shall work remotely. The Consultant shall make preliminary calculations supported by sketches for approval before commencing final detailed drawing. The detailed drawings shall be done in AutoCAD software.

**Reporting Schedule**

During the design of the pressed elevated water tanks, foundations, within one week of commencement of the assignment the consultant will prepare and submit the draft design for validation to Concern.

* A report showing Calculations upon which the foundation, steel tank and steel tower shall be predicated.
* Detailed drawings that are derived from the above calculations for the foundation (including bar bending schedules) works, (including the recommended steel classes and thickness) for all vertical, diagonal and horizontal members.
* Envisaged Concrete mixes and specifications for the foundation.

Second (2) week, the following shall be submitted for review;

* Submission of detailed design, drawings of the foundation, steel tank and steel tower
* Detailed drawings with incorporation of any comments
* Draft tender documentation including contract for the procurement of the Contractor.

All deliverables as specified below shall then be submitted 3 weeks after the commencement of the assignment for review and validation.

**Expected outcomes:**

Design and Bidding Documents to be produced should have a simple design philosophy and contain:

* Ordered set of calculations, considering all aspects listed above
* Detailed Bill of Quantities for the whole structure including foundations, steel towers, and steel tanks.
* Technical specifications for the construction of pressed steel elevated tanks.
* Construction status drawings appropriately checked
* Reinforcement drawings and bar bending schedule
* To-scale long-section drawings of each section as specified above: two (2) no. hard copies and one (1) no. soft copy. The soft copies for the drawings will be both .pdf files (A1 size) and as AutoCAD .dwg files.
* Tender/bidding document for construction of the pressed steel elevated tanks
* Draft contract for the procurement of the Contractor.

**Deliverable schedules.**

Key deliverables as per schedule below.

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| --- | --- |
| **Deliverable** | **Timeline** |
| Preliminary design report & drawings | Within one (1) week from signing the contract |
| Submission of detailed design, drawings | Within two (2) weeks from signing the contract |
| Final submission and acceptance of detailed design drawings, tender/bidding documents including draft contract for the procurement of Contractor | Within three (3) weeks from signing contract |

**Report format**

The report, A4 typed in Arial font size of 11 point, single line spacing, no longer than 30 pages excluding annexes, appendices will be presented in English. It should be submitted in **WORD** format. ToR should form part of the annexes.

**Qualification required**

* Bachelor’s degree in Civil Engineering with specialization in Structural Engineering.
* Preference shall be given to Engineers with a mix of Water, Structural and Geotechnical works
* MUST be registered with the South Sudan Professional Engineering Board and/or any other recognized Professional Engineers Board.
* Seven (7) years of experience with at least 3 years of similar nature of assignment.
* Excellent speaking and writing English skills.

***Technical Competencies:***

* Excellent technical and analytical skills
* Excellent reporting and presentation skills.
* Excellent knowledge of and experience with humanitarian guidelines, principles and standards.
* Willingness to work under pressure & meeting deadlines.

1. **Lines of Communication**

The Consultant will report to WASH Programme Manager of Concern Worldwide South Sudan, but will work closely with the Bentiu Area Coordinator, WASH Engineer, Environmental Health Project Manager, and Deputy Programme Director.

1. **General Conditions including terms of payment of the consultancy**

* The consultants shall have their own laptop and Engineering design software (AutoCAD) to complete the work assignment.
* The consultancy shall work remotely for this assignment with clear timelines and deliverables.
* Mode of the payment by cheque or bank transfer to the consultant shall be one off upon submission of and acceptance of the design report and tender documents
* Payment will be subject to 10% withholding tax, as per South Sudan law unless the consultant provides confirmation that s/he is exempted.

**8. Application procedures**

All expressions of interest should include:

* Cover letter: A short (maximum one page) letter.
* Detailed Curriculum Vitae (CV) of the consultant (maximum 4 pages), highlighting education, professional experience, registration with professional bodies.
* Financial Proposal: The financial proposal should provide cost estimates for services rendered including daily consultancy fees, any incidentals.

**Note**: Evaluation and final selection will be based on educational level, previous experience of the consultant, understanding of consultant of the ToR and submission of the expression of interest.

Expression of interest should be sent:

* By email to [SouthSudan.DeskOfficer@concern.nett](mailto:christine.kiernan@concern.net)
* In a sealed envelope, clearly indicating “Structural Engineer Consultancy”, addressed to “The Procurement Department, Concern Worldwide - Airport Road, Juba, South Sudan”

Applications must be submitted by **01st December 2021, by 5:00pm (EAT).**

1. IOM DTM figures-June 2021 [↑](#footnote-ref-1)
2. Current Bentiu IDP camp [↑](#footnote-ref-2)
3. Geotechnical site investigation for proposed elevated water tank treatment plant, Bentiu, Unity State, Rubkona, September 2021. [↑](#footnote-ref-3)
4. Hydraulic modelling and technical assessment report, April 2020 [↑](#footnote-ref-4)