



TERMS OF REFERENCE BOREHOLE DRILLING

“MASTER DRILLER FOR 3 NEW BOREHOLES, FLUSH, DEVELOP AND PUMP TEST 5 IN MABAN REFUGEE CAMPS”

Background

ACTED South Sudan received funding from BPRM for implementing programs on Strengthening essential WASH and protection services in Maban camps and surrounding host communities. In the improvement of water supply in the camps, ACTED will drill additional three (3) boreholes, flush, develop and pump test to the satisfaction of the donor to ascertain their effectiveness. Further on flush, develop and pump test two (2) existing boreholes drilled in November 2020 at Offra. The 5 boreholes will be motorized including with generator and solar systems. Therefore, the boreholes should be able to supply sufficient water to the refugees.

Based on the needs, ACTED South Sudan is looking for a Master driller with over 10 years' experience in carrying out drilling of deep boreholes for up to 100m deep especially in Maban County, Upper Nile State. Experience with use of DTH rig, hammer drilling, mud drilling and ELGI compressor 15,000KW power is highly recommended. Installation of submersible pumps, generator systems for the boreholes is added advantage to be able to complete system pump testing. Therefore, the Master driller must have the capacity to use the ACTED under right of use (ROU) drilling rig and compressor system.

Scope of Work (SOW)

Under the guidance of the WASH team in Maban, with the support of UNHCR Sub Office WASH Unit, the master driller must perform in a satisfactory manner, the drilling of three (3) boreholes to be installed with submersible pumps complete with generator and solar systems at the site specified in the camps. Also complete successfully the flushing, development and pump testing of the 5 boreholes.

The boreholes will be drilled to a specified depth of not more than 100m in Yusuf Batil (one borehole) and two boreholes in Doro camp. The depths are tentative and for guidance for planning purpose. The two boreholes in DORO will be replacements of the previously collapsed boreholes due to flushing and lack of bottoms caps. Yusuf Batil borehole will be decided upon site visits and discussion with the beneficiaries. The master driller is expected to carry out geophysical analysis in relation to the existing boreholes and or advice on the appropriate drilling site as feasible for obtaining safe adequate water for the refugees. The master driller will again be required to guide the team in the provision of the necessary construction materials for the boreholes to ensure the works are carried out in a satisfactory manner. The driller will advise on the boreholes siting points, construction of the mud pits, provision of water for drilling, use of polymer and complete satisfactory drilling.

Drilling arrangements

1. Drilling of the boreholes considering the geologic conditions to a minimum internal diameter of 200mm (8") to an average depth of 80 meters of replacement boreholes in Doro camp and up to an average depth of 100m for Yusuf Batil camp. ACTED will consider a borehole successful only if it



meets the above stated conditions of depth and a minimum critical yield of 10m³ /hr in Doro and 15m³ /hr confirmed through a critical yield analysis obtained after 8 hours of continuous constant rate pump test.

2. The master driller will quote for the works as “ **Skilled Labour for Operating Rig and compressor Systems, Master Driller for Deep Boreholes. Drilling 3 boreholes (2 in Doro Camp, and One in Yusuf Batil) Flushing, Development, Pump Testing of the same. And Flushing, development and pump testing of 2 boreholes in Offra**” taking in consideration drilling depths can vary.
3. Borehole drilling and construction will be under the supervision of ACTED WASH Coordinator in collaboration with UNHCR WASH Officer or representative. ACTED will have the final authority in making technical decisions to the contractor
4. Cuttings (min. 125 grams) of the strata penetrated shall be collected on site at every 2- meter interval or every drill pipe; whichever gives the smallest interval and when required by ACTED supervisor, by whatever method is standard for the drilling technique in use and approved by the Supervisor. The driller shall take every possible precaution to guard against cutting contamination. Representative lithological samples shall be packed in sealed containers and with clear marked labels covering the borehole location, number and depth interval. The samples shall be stored in a location where they will not be contaminated by site conditions or drilling operations.
5. The master driller will install a 5.5" internal diameter UPVC Plain casings to a total depth of well except where screen casings are installed. There should be at least 3m of plain casing as well as a sump/plug at the bottom of each well. The driller should ensure verticality of the casing installed.
6. The master driller will install a 5.5" internal diameter UPVC Screens. The quantity/length of screen casings to be installed in the borehole will vary respectively to the aquifer formations.
7. The master driller will install filter gravel pack as provided by ACTED. The installation of the filter pack should be done satisfactorily according to driller’s experience with the installation to ensure an even distribution of materials and to reduce the risk of materials bridging in the annulus. The use a flowing water shall also be accepted as a method of passing the gravel through the annular space between the casing and the sides of the borehole.
8. The driller should ensure the installation of sanitary seal in the annular space between the screen casing and the borehole above the filter gravel pack to reach a minimum height of 3 meters. Above the sanitary seal, the annular space shall be backfilled with cuttings extracted through drilling up to 3 meters deep below the ground level. The sanitary top seal in cement grout, corresponds to the first 3 meters below the surface. Including 2m of sanitary seal and 1m of grout at the surface
9. The boreholes must be developed by airlifting for a minimum of 4 hours until a stabilized satisfactory yield is reached and the turbidity is less than 5 NTU.
10. Constant rate pumping test should be conducted by the driller for a minimum of 8 hours with a specified pump and a continuous recovery. Constant rate pump test and recovery data should be reported on the borehole log and should contain at least: Date of Test (Day, Month, Year); Depth of BH at time of test (m); Static Water Level (SWL) before test (m); Type of Pump used; Depth of Pump Intake (m); Discharge (Ltrs/Minute); Dynamic/Pumping water level (m). ACTED’s supervisory staff should be informed, in writing (email), at least 24hr before the scheduled time for carrying out of the pumping test. The procedure should be discussed and agreed by both parties before the driller could initiate the pumping test.
11. After a successful completion of drilling and water testing, the borehole should be thoroughly disinfected with a chlorine-rich solution, granular Calcium Hypochlorite (HTH) at a concentration of 500 grams per cubic meter of pack. This will initiate the process of sterilizing the borehole and the



chlorine solution should stay in the well for at least 4 hours at the specified concentration, leaving a concentration of residual chlorine of 50 milligrams/litres (as per WHO standards). The disinfection procedure shall be discussed with ACTED's supervisory staff in order to seek approval.

12. The master driller will coordinate with the WASH team to collect water samples for quality analysis, physical, chemical and bacteriological where feasible to determine the potential use of the boreholes to ascertain its suitability for human consumption.
13. The driller will prepare Borehole Completion Records including the drilling report, borehole logs, borehole design, casing arrangements, pump testing data etc as approved by the ACTED supervisory team.
14. After the completion of the borehole, the driller is expected to submit a report of the borehole drilling in which all the relevant information and drilling velocity, well casing and other well construction operations will be recorded. The driller is to provide details on the water filtrations and aquifer, types of rock found and sampling details including geophysical testing analysis, drilling lithology log, sieve analysis, GPS coordinates, casing details, filter pack details, constant rate testing procedures and results, recovery testing results, yield, draw-down, disinfectant calculations and procedures, pump location installation depth. No payment will be made prior to reception of all the documents described above as per borehole completion template

The role of the Master driller

The driller will have to provide for the construction and completion in every detail of the work described in the contract and contractual documents such as ToRs, annexes and procurement memos. The master driller will provide skilled labour for the operation of the rig equipment, compressor system and all the requirements of the drilling operations. Also the driller will have to complete the work in accordance with the specifications and terms of the contract. The driller cannot deviate from the approved borehole designs or specifications without seeking for permission and approval from ACTED. If the borehole cannot be completed due to unavoidable circumstances such as weather, force majeure, insecurity, or the borehole required to be abandoned as a result of loss of tools, accidents or any unforeseeable circumstances, the driller will be required to secure the casings or pipes already in the hole and refill it with clay or concrete. The driller thus will be requested to complete a replacement borehole at a negotiated rate next to the abandoned hole if need be.

Enforces safety of staff and effectively manages the drilling team to ensure reliable operation of the equipment in order to complete work in a timely fashion.

Trains key members of the drilling team on how to operate drilling equipment and helps to manage all challenges related to the installation of boreholes and wells.

NB: *Cost of the food supplies and expenses will be the responsibility of the master driller both at Juba and at the project site. As well as the international flights, accommodation and transport in Juba are sole responsibility of the driller. Plus, insurance covers or any treatments, hospital visitation will be at the cost of the driller.*

Role of ACTED



ACTED as the sponsoring organization with provide, all casual labour, materials, tools, equipment, machinery, drilling consumables, transportation during field work, as well as to and from Juba. Also ACTED will also provide accommodation for the driller in Maban during the project period, and provide transport means to the project sites.

Health and Safety

The master driller shall take all reasonable precautions to prevent any accidents or injury to persons during said undertaken activities. These precautions shall include ensuring that all tools and equipment are handled with care and that the team is well guided to minimize risks through adoption of safe working practices. The driller shall develop a security plan in consultation with ACTED, including detailed procedures to cover evacuation in case of any, safeguarding of ACTED's equipment and supplies, unlawful interference and prevention of unrest.

Requirements for the Award

Experience: The master driller is required to be an individual with proof of satisfactory completion of same category of works, references are required and must provide contract completion certificates of work performed of at least 20 boreholes. ACTED would like to engage an experienced driller with extensive knowledge of Maban operations and or Upper Nile region of South Sudan. Also the individual should provide proof of operating the drilling systems mentioned below satisfactorily.

Equipment: The driller should be able to operate successfully and efficiently a Majoros hydraulic top drive rotary Rig-Manufactured in 2011 by Audie steel and Engineering, with capacity to do over 100m borehole depth, mounted on a Hino Truck. Operate an ELGI compressor mounted on a trailer with 15,000KW power, model DS900-350, 350 PSI 900CFM. The drilling in Maban camps are mostly rotary types. The mud drilling methods.

Duration of drilling. The driller is required to provide the schedule of works to ascertain the borehole completion period. The estimated period for the works is one month from the start date and it should be possible by end of December 2021. The driller is therefore requested to provide tentative schedule matching the estimated timeline.

Legal South Sudan documents or as appropriate. The driller must present a copy of the valid drilling certificate if any. And/Or provide necessary documentation that indicates authorization to operate drilling equipment's/ work in South Sudan and is approved by the authority.

Quotation amount. The driller should provide cost for the works as skilled labour for drilling, flushing, development and pump testing of the boreholes to ascertain sufficient yield. The amount should cover all expenses including the activities under the contract, as well as any other administrative costs that the driller must incur.

Defect liability period. The borehole will be guaranteed for a period of 3 months after completion. In an event that there are defects found on the borehole within this period, the driller will be notified and authorized to correct all the said defects at his own costs.