

Pumping Test

Term of reference

Background

Relief International (RI) is one of the leading international NGOs in Sudan particularly in North Darfur (ND) and Blue Nile (BN) States and currently has been operating for 17 years in ND and 5 Years in BN providing essential and integrated services on health, nutrition, and WASH across 30 health facilities, as of 2022-2023. It has established a presence in ND with an office in Elfasher, a sub-office at Almalha, and a shared satellite office at Sarafomera (with partner APD). RI has already ongoing integrated Health, Nutrition, and WASH interventions at Almalha and Sarafomera with other funding addressing the immediate needs of the vulnerable community. In BLNS, RI has the main office in Damazine and already intervention in integrated WASH, Health, and Nutrition at most of the localities targeted by this action.

Currently, under BHA funding, RI is implementing the integrated Health, Nutrition, and WASH services project entitled ‘Restoring Lives of Affected families and Communities through Integrated Emergency Response in Sudan’ in Health facilities and communities in ND and BLNS. One of the activities planned under the WASH sector is the solar upgrading of two water yards, one in ND and one in BLNS. To double-check the safe yield of the borehole, to ensure the BH is suitable for the solar upgrade, and as per BHA’s requirement, RI wants to conduct a pumping test for the two selected water yards prior to the solar upgrade work. Therefore, the purpose of this ToR is to outline the pumping test for these two BHs.

Scope of work

The Contract to be established is for the Pumping test of **two** boreholes in

<i>Location</i>	<i>Sub Location</i>	<i>Coordinates</i>
<i>North Darfur, Sudan</i>	<i>Zamzam Camp Shakir BH</i>	<i>13.495853 25.287163</i>
<i>Blue Nile, Sudan</i>	<i>Al Rosaries, Ganees East Borehole</i>	<i>11.808983 34.399183</i>

The borehole pumping test must be done with appropriate standard procedure with a detailed report and a water quality test. The withdrawal and installation of the existing pump sets from the Borehole is the responsibility of the pumping test contractor.

The project shall be under the control of the Designated Representative appointed by the client. The Designated Representative shall appoint one or more Supervisors who shall be responsible for the management and direction of the project on-site and shall approve all materials supplied works, and measurements carried out by the Pumping test contractor and his team of workers on the project.

Specific details of the scope of work and deliverables:

- Provide and transport all required equipment, material, and labor to the site.
- Removing of equipment including raiser main, connecting, rods, and submersible pump/handpump

- Provide all pumping test equipment including the submersible pump with full accessories, and a manual generator or an alternator to operate the pump.
- Provide a qualified technical person to run the pumping test accordingly with using the approved pumping test format.
- Provide a submersible pump of appropriate size and capacity for pumping the water and measuring the dynamic water level during the pumping interval and then read drawdown.
- Use a water level indicator to measure SWL and DWL.
- Calculate the handpumps yield by using Jerrican (4gallon) then change it to the appropriate unit (m³ or liter).
- After reaching the steady state of dynamic water level stop pumping and measure recovery and record the data
- Pump test should extend to an appropriate time length.
- Finally, the vendor detailed able to provide detailed recommendations technical about the yield of the well.
- Capacity of submersible pump, pump position, static and dynamic water level, and Borehole diameter.
- Borehole estimated depth, number raise main installed.

Pumping Test

The Drilling Contractor shall conduct a pumping test on the completed borehole for at least 12hrs with both a step test and constant rate test beginning with a step test.

Immediately after the constant rate test has been completed, the Drilling Contractor shall measure water-level recovery in the borehole, unless the water level has recovered to the original level in less than that time. In case of a breakdown of the equipment during the pumping test, the borehole shall be allowed to recover for at least 6 hours or to the previous static water level before repeating the pumping test.

During the pumping test, the Drilling Contractor shall decide on the disposal of all water arising from the tested borehole by means of an impermeable pipe, flume, or lined trench to a point at least 50 meters downslope from the tested borehole to minimize the risk of recharging the well.

Major tools are needed for the pumping test by the contractor.

- Submersible pump
- Generator
- Dipper
- Essential valves and fittings
- Discharge pipes
- Riser pipes
- Compressor

Essential precautions need to be taken by the pumping test contractor.

- Make sure that contaminated water cannot enter the borehole during test pumping, especially when using temporary pumping equipment in an open borehole, and when there is water spillage or run-off from rainfall during the test.
- Provide adequate sanitation facilities for the field staff and test-pumping crew, and insist that they follow good hygiene practices, particularly hand-washing. Also, if one of the workforce has symptoms such as persistent diarrhea or prolonged unexplained fever, recommend that he or she not work on the test.
- Ensure that all equipment that will come into contact with the groundwater or the wellhead (pumps, pipes, valves, dippers, samplers, bailers, ropes, tools, etc.) has been cleaned properly before use, especially if it has previously been in contact with contaminated water. Don't forget to flush contaminated water out of pump chambers, valves, and rising mains.
- If mechanical equipment such as mobile generators, air compressors, and drilling rigs is being used, make sure that it is in good condition, with no leaks of hydraulic fluid, lubricating oil or diesel, or other fuels.
- Make adequate arrangements for the temporary storage of drums or containers of fuel, oil, or other hazardous substances, and enforce good practices for refueling, so that there is no danger of contaminating the water supply during the test pumping.
- Make sure that the borehole has been secured when you leave it, so that foreign objects, animals, or dirty water cannot enter.