

Terms of Reference for Detailed Design of Water Abstraction and Transmission System from Lasdhure Aquifer to NGDPS Hargeisa Water Agency (HWA) P101-066 to P101-069

1. Background

The Somaliland Development Fund (SDF) was established in 2012 to provide a single vehicle through which development partners could support Somaliland's development goals. The first phase of the SDF was implemented in 2013-2017 and supported the Government of Somaliland (GoSL) filling a critical gap through funding projects that are fully aligned to the National Development Plan (NDP) while at the same time recognizing the role of GoSL in the delivery of basic services.

The Somaliland Development Fund – Phase 2 (SDF2) covers the period 2018-2024. SDF2 is conceived as an inclusive economic development program. It supports the GoSL in delivering infrastructure that is relevant for inclusive economic development. It focuses on sustainable investments that spur job creation and fast growth, while at the same time laying the foundation for long-term resilience and development, leading to a more stable and peaceful Somaliland. SDF2's support is fully aligned with government priorities as defined in the National Development Plan 2 (NDP2) 2017-2021 and reflect the priorities set out in Somaliland Vision 2030.

The objectives of the SDF2 are threefold:

- Support increased inclusive economic growth through investment in productive, strategic infrastructure to enhance economic growth and revenue generation.
- Strengthen and maintain the capabilities of the government of Somaliland to prioritize and manage the sustainable and equitable development of Somaliland's infrastructure.
- Support strong government ownership of development priorities aligned with the National Development Plan.

2. Hargeisa Water Agency project

The SDF has allocated funds to the Hargeisa Water Agency (HWA) for the implementation of the Increasing Water Production from Lasdhure Aquifer and Connecting to Existing System at New Geed Deeble Pumping Station (NGDPS) Project. The project contains four major components:

Output 1: Capacity building

The first component involves capacity development for HWA to enhance its institutional ability to effectively initiate, deliver, and support the management of investments/projects. Crucial for economic development and value for money being realized as a result of the projects, will be the ability to select investments with comparative strategic economic and social advantage for diverse members of the population and which are resilient to current and future shocks (climate and otherwise).

Output 2: Community engagement

The second component involves community engagement through creation/enhancing or formation of community water committees in the areas directly affected by the project areas in Hargeisa. The purpose of the water committees will be for disseminating project information and dialogue on project issues, especially the use of the water supply among the different communities in Hargeisa.

Output 3: Increased water production through groundwater abstraction in Lasdhure aquifer and connecting to the existing system at Geed Deeble

The third component involves drilling of 4-6 boreholes, design of the wellfield collector system, supply and installation of pipes, fittings, valves, and electromechanical equipment to connect the boreholes to the NGDPS.

Output 4: Technical studies

The fourth component involves conducting three technical studies: (1) Comparative advantage of investing in rural versus urban water supply projects, based on clear VfM considerations, risk, results, need and other possible financing options; (2) Study on increased accountability on performance and pricing of water in urban water supply systems including pro-poor tariff study; (3) Study on sustainable water provision to Hargeisa looking at the present water demand vs water supply, future water demand and population and city growth prospects and updating of the 2007 HWA masterplan.

3. Background to the assignment

Based on the findings of the Lasdhure aquifer hydrogeological studies, HWA is targeting to drill and connect about nine boreholes from the Lasdhure aquifer at different times based on availability of funding and suitability of the water once the boreholes are drilled. Out of the nine boreholes, one borehole was drilled with funding from SDF1 and has an estimated yield of 65m³/hour. With SDF2 funding, HWA is planning to drill an additional five boreholes in Lasdhure aquifer. Drilling is expected to be completed by end of March 2021. Additional three borehole sites identified in the hydrogeological study will be drilled at a later stage based on funding availability and therefore not a part of this assignment.

After the completion of the drilling of the boreholes, the SDF Secretariat on behalf of HWA intends to engage the services of a team of individual experts to prepare detailed designs and bidding documents for the abstraction and transmission system from 6-9 boreholes to the existing NGDPS. Award of the contract will depend on the results of the borehole drilling activity.

4. Objective of the assignment

The objective of the consulting services is to prepare detailed designs and bidding documents for the abstraction and transmission system from 6-9 boreholes to the existing NGDPS. Estimated length of the feeder and collector pipelines is 13-16 kilometers.

5. Scope of required services

The team of design experts are expected to conduct the following tasks:

5.1 Task 1: Estimation of boreholes' safe yield and future expansion

Properly estimate the boreholes' safe yield (based on the pump testing) and future expansion possibilities or connecting additional boreholes that will be drilled in the future.

5.2 Task 2: Topographic surveying of pipeline routes and boreholes sites

5.2.1 Surveying

- Conduct reconnaissance and select the most economical pipeline route for the feeder and collector pipelines.

- Conduct detailed topographic surveying of the proposed feeder lines from 6 boreholes and the collector pipelines of around 13-16km long.
- The surveying shall be conducted by means of a Total Station or Geodetic GPSs and the contour shall be at an interval of 0.5 meters. The expert shall clearly indicate type of equipment and number of reflectors s/he will deploy when applying for the assignment.
- The surveying corridor along the proposed feeder lines shall have a width of 20 meters, i.e., 10 meters on each side of the new/proposed feeder pipeline route centerline.
- The surveying area along the possible collector pipeline routes with a width of 30 meters, i.e. 15 meters on each side of the new/proposed main pipeline route centerline.
- Take points including rock locations (if visible), wadi crossings along the proposed pipeline routes and reflect these features on the final drawings produced.
- The pipe alignment shall follow a smooth horizontal and vertical profile to avoid the need for bends unless with agreement of HWA.
- The topographic surveying expert shall arrange to place plain concrete beacons of 10X10X30 Cm size every 100 meters along the proposed/new pipelines including at pipe deflection points. Materials for beacons to be provided by the project.

5.2.2 Survey outputs

After completing the surveying, the expert shall produce the following deliverables:

- General plans and profiles showing the infrastructure and alignment of the proposed pipelines. These shall be prepared in AutoCAD format as well as superimposed on Google Earth. The plans and profiles shall show features such as roads, farms, valleys, marshy areas, gullies, rock (if visible) etc.
- Prepare a detailed plan and long section drawings:
 - Indicative long sections of proposed feeder pipelines and collector pipelines in AutoCAD with Google earth images in the background.
 - When preparing plans and profiles, the horizontal and vertical shall have a scale of 1H : 1V.
 - The original drawing size shall be A1 (although A3 prints are acceptable for review).
 - The plans and profiles shall be subdivided into a length of not more than 500 meters per sheet on A1 size drawings.
 - All font size used shall be readable on A3 drawings.
- All data on actual survey points shall be provided in soft copy in a format readable by AutoCAD, Civil3D and other standard software design packages. All survey points shall have an x, y and z value tied to the local coordinate system.

5.3 Task 3: Detailed engineering designs, preparation of bill of quantities, cost estimates and technical specifications

5.3.1 Civil works at each borehole site

- Prepare detailed designs, bills of quantities, drawings, and technical specifications for civil works like generator house, fuel depot, caretaker room, washroom, fencing, etc. at each of the 6 boreholes sites.
- Prepare detailed designs, bills of quantities, drawings, and technical specifications for structures such as river crossings, road crossings, trust blocks, etc.

5.3.2 Hydraulic design and pipe sizing

- Using appropriate water supply modeling software such as EPANET, Water CAD, etc. calculate pipe diameters, pressure rating and type of pipes and accessories such as valves, fittings etc.

- Conduct surge analysis to determine locations where air valves or surge vessels are required.
- Identify locations for washouts and air valve chambers and prepare detailed working drawings with pipes and fittings detail and technical specifications.
- Identify locations for river crossings and design appropriate type of river crossing with pipe and fittings details and specifications.
- Design appropriate junction chambers with pipes and fittings details and specifications.
- Design capacity or size of submersible pump for each borehole based on the outcome of the pump testing and hydraulic simulations.
- Design appropriate rising main for each borehole and prepare bill of quantities, technical specifications, and detailed drawings.
- Prepare details of all pipes and fittings, valves and accessories required for the feeder and collector pipelines.
- Prepare detailed bill of quantities for equipping boreholes, feeder/collector pipelines, chambers, river crossings and related works.

5.3.3 Electromechanical design and sizing

- Specify/size the submersible pumps, booster stations (if need be), and pumping system characteristics and other associated requirements like cables, etc.
- Select electric motors that matches the specified pump considering power output of the pump, borehole yield, operating pressure head against which the pumps must discharge.
- Calculate/design power requirement for each of 6 boreholes' submersible pumps.
- Design appropriate power supply for Lasdhure water abstraction and transmission to NGDPS with different options such as generator/s at each borehole site, central generator for all the 6 boreholes, solar system, high tension lines from NGDPS to each of the 6 boreholes, and combinations of these. The expert is expected to prepare advantages and disadvantages for each option in terms of operations and maintenance (O&M) and initial investment.
- Estimate power generating capacity and the need at NGDPS to make sure that it can accommodate Laasdhure pumping systems.
- Design of SCADA System for Lasdhure water collection and transmission system.
- Design solar lighting system for the borehole sites and NGDPS.

5.3.4 Preparing list of pipes, fittings and electromechanical equipment for importation

Prepare detailed list of materials such as pipes, fittings, valves, pumps, generators, etc. with detailed technical specifications for importation.

5.4 Task 4: Preparation of bidding documents for supply of materials, equipping of boreholes, feeder/collector pipelines

Preparation of bidding documents using SDF approved standard bidding documents, with due consideration to appropriate procedures – National Competitive Bidding (NCB), International Competitive Bidding (ICB) as outlined in the SDF Procurement Manual. The tender document should include conditions of contract, technical specifications, bills of quantities, working drawings and engineering cost estimates.

5.5 Task 5: Stakeholder meeting/dissemination workshop

To ensure organizational and stakeholder wide appreciation and ownership of the final assignment/design outputs and recommendations, the design team shall organize a findings dissemination workshop in Hargeisa where key findings and options analysis will be presented selected stakeholders who will be invited by the HWA and SDF Secretariat. The cost of the workshop shall be met by the project.

5.6 Task 6: Other requirements

The design team is expected to undertake the services described in this ToR in close cooperation with HWA. The design team's tasks for execution of this assignment have been outlined as detailed as possible. However, the design experts shall bear in mind that the list of tasks and activities can by no means be considered as a complete description of the experts' duties. It is the experts' responsibility to critically verify the scope of services indicated and to extend, reduce or amend it wherever deemed necessary in their own professional judgment. It is to be understood that the experts shall perform all work as necessary to meet the objectives of the project.

6. Duration of the assignment

The assignment is expected to be implemented over a period of 4 calendar months.

7. Design team composition, individual input and qualifications

7.1 Team composition and inputs

The design team shall comprise of the following personnel, who will be mobilized at different stages of the assignment and shall work under the assignment Team Leader.

Expertise	Working days
Team Leader/Water Distribution System Design Engineer	60
Electromechanical Expert	25
Topographic Surveyor	30
AutoCAD Engineer/Draughtsman	35

7.2 Team qualifications and experience

The above individual experts are expected to have the following qualifications and experience.

Expert	Key qualifications
Team Leader / Water Distribution System Design Engineer	<p>The expert shall be the overall Team Leader of the assignment and shall be responsible for execution of the assignment including consolidation of the assignment's deliverables, coordinating addressing of comments as well as delivering final product for this assignment. In addition to the overall responsibility, the TL will be responsible for delivering tasks 5.1, 5.3.1, 5.3.2, 5.3.4, 5.4, 5.5 and 5.6. The TL is expected to have the following qualifications and experience.</p> <p><u>Qualifications and skills</u></p> <ul style="list-style-type: none">• At least a Master's degree in Water Supply Engineering, Civil Engineering (with Water Specialization) or any other relevant water related field.• Registered professional engineer with a recognized engineering body.• Demonstrated excellent command of spoken and written English. <p><u>General professional experience</u></p> <ul style="list-style-type: none">• Minimum of 12 years' experience working in senior level in water supply sector projects in Sub Saharan Africa.

	<ul style="list-style-type: none"> • Minimum of 10 years' experience in planning, design, implementation/construction of urban water supply systems. • Minimum of 5 years' experience in East and Horn of Africa. <p><u>Specific professional experience</u></p> <ul style="list-style-type: none"> • Minimum of 7 years' experience with design of construction of water supply systems using multiple boreholes as a water source which decant into a single collector system. • Minimum of 7 years' experience in use of water transmission/distribution modelling software such as EPANET, WaterCAD, Water GEMS, AutoCAD etc. • Must have executed at least 3 similar assignments in the last 5 years.
Electromechanical Engineering Expert	<p>The Electromechanical Engineering Expert (EME) shall be responsible for delivering on all electromechanical related tasks under the assignment. The EME will specifically be responsible for delivering tasks 5.3.3, 5.3.4, 5.4,5.5 and 5.6. The EME will be expected to have the following qualifications and experience.</p> <p><u>Qualifications and skills</u></p> <ul style="list-style-type: none"> • At least a Bachelor's degree in Electrical Engineering or Electromechanical Engineering. • Registered with a recognized engineering body. • Demonstrated excellent command of spoken and written English. <p><u>General professional experience</u></p> <ul style="list-style-type: none"> • Minimum of 10 years' experience in designing and installing electromechanical equipment for abstraction of groundwater. • Experience working within East and Horn of Africa. <p><u>Specific professional experience</u></p> <ul style="list-style-type: none"> • Minimum of 8 years' experience in design of water supply electromechanical works. • Minimum of 5 years' experience in use of computer software such as AutoCAD and electrical modelling software. • Must have designed at least 3 similar systems in the last 5 years.
Topographic Surveyor	<p>The Topographic Surveyor (TS) shall be responsible for delivering on all surveying related tasks under the assignment. The TS will be responsible for delivering tasks 5.3 and 5.6. The TS shall have the following qualifications and experience.</p> <p><u>Qualifications and skills</u></p> <ul style="list-style-type: none"> • At least a Bachelor's degree in Surveying. • Registered with the relevant surveying body. • Demonstrated excellent command of spoken and written English. <p><u>General professional experience</u></p> <ul style="list-style-type: none"> • Minimum of 10 years' experience in land survey. • Experience working within East and Horn of Africa. <p><u>Specific professional experience</u></p>

	<ul style="list-style-type: none"> • Minimum of 8 years' experience in land survey for water projects. • Minimum of 5 years' experience in use of computer aided surveying software and AutoCAD and equipment such as Total Station and processing of survey data into reports. • Must have carried out at least three similar assignments in the last 5 years.
AutoCAD Engineer/Draughtsman	<p>The AutoCAD Engineer/Draughtsman shall be responsible for delivering on all tasks under the assignment requiring engineering drafting. The expert shall be responsible for delivering tasks 5.3, shall be preparing drawings in AutoCAD and will edit drawings prepared by other experts like the TS and the EME. The AutoCAD Engineer/Draughtsman shall have the following qualifications and experience.</p> <p><u>Qualifications and skills</u></p> <ul style="list-style-type: none"> • At least a Bachelor's degree in Civil Engineering, or a Higher National Diploma in Water Engineering / Building and Civil Engineering or Architectural Draughtsmanship. • Demonstrated excellent command of spoken and written English. <p><u>General professional experience</u></p> <ul style="list-style-type: none"> • Minimum of 10 years' experience in engineering drafting. • Experience working within East and Horn of Africa. <p><u>Specific professional experience</u></p> <ul style="list-style-type: none"> • Minimum of 5 years' experience with the use of computer aided surveying software and AutoCAD to process the surveying data. • Must have carried out at least two similar (water supply) assignments in the last 5 years.

8. Reports and reviews

In addition to the hard copies of the reports, an accessible secure link with soft copies of final reports, tender documents, bill of quantities and drawings in easily editable versions (in Word, Excel, AutoCAD, EPANET, Water CAD etc.) shall be submitted to the SDF Secretariat/PMT by the Team Leader of the assignment. The assignment shall be expected to deliver reports as follows:

Report	No. of Copies	Date of Submission
1. Inception Report	3 hard copies + 1 soft copy	1 week after commencement of assignment
2. Detailed topographic surveying report and plan profile drawings	3 hard copies + 1 soft copy	1.5 months after commencement of assignment
3. Draft detailed design report, draft bill of quantities, draft drawings, and draft cost estimate	3 hard copies + 1 soft copy	2.5 months after commencement of the assignment
4. Draft list of pipes, fittings, valves, accessories, submersible pumps,	3 hard copies + 1 soft copy	2.5 months after commencement of the assignment

Report	No. of Copies	Date of Submission
generator, etc and relates supplies for importation.		
5. Workshop proceedings report on final designs	3 hard copies + 1 soft copy	1 week after submission of draft detailed design reports and draft drawings
6. Second draft detailed design report, bill of quantities, specifications, engineering estimate & tender documents	3 hard copies + 1 soft copy	3.5 months after commencement of the assignment
7. Final detailed design report, bill of quantities, specifications, engineering estimate & tender documents after incorporating comments final comments	3 hard copies + 1 soft copy	4 months after commencement of the assignment

8. Reporting arrangements

- The experts will work under the overall supervision of the SDF Secretariat Deputy Team Leader – Projects but will technically report to the Water Sector Specialist at the SDF Secretariat.
- The experts will work closely with the Project Manager, assigned to manage the Project by the HWA.

9. Fees and allowances

- The successful candidates will be offered competitive daily fees. The fees will be paid upon submission of the final report, timesheet and an invoice.
- All fees will be paid after the completion and approval of the final report.
- The SDF Secretariat shall organize and pay for the experts' accommodation, travel within Somaliland, and DSA as per SDF guidelines.

10. Equipment

No equipment is to be purchased on behalf of the Client/Contracting Authority as part of this service contract or transferred to the Contracting Authority or local counterparts at the end of this contract. The experts are expected to either rent or bring his/her equipment to complete the consultancy assignment with all the necessary software installed.

11. Duty of care

- The experts will work under the overall SDF Secretariat Health, Safety and Security protocols.
- The experts will be expected to provide own insurance for health care (which must include Medevac provision), accidents, and other risks associated to the assignment. The SDF Secretariat shall be free from any liabilities arising from the same.

12. Other provisions

- Relevant documents and data will also be gathered and be ready for the experts' review upon arrival.

- Duty post: The work is to be performed in Hargeisa with frequent travel to Lasdhure, some 30-40 kilometres from Hargeisa, Somaliland.
- Personal Computers: The experts shall be responsible for the provision of their own computers.
- The SDF Secretariat will provide transportation by air or road for the experts from their home to Hargeisa.
- The SDF Secretariat will arrange all transport by road or air as needed.
- The SDF Secretariat will arrange accommodation.