

**Terms of Reference P101-083-085**  
**Detailed Design of Ilaan Dam and Related Infrastructure, Sanaag Region**  
**Ministry of Livestock and Fisheries Development**

## **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 NDP.

## **2. Ministry of Livestock and Fisheries Development proposed Project**

The SDF has allocated funds to the Ministry of Livestock and Fisheries Development for the implementation of the Strengthening Animal Production and Health Services Project in Togdheer and Sanaag Regions. The project intends to do institutional capacity enhancement by training ministry staff on animal production, training on research and data management, upgrading of Aroori Livestock Holding ground into Livestock Centre of Excellence and supporting the production quality animal feed by supporting the fodder producing private sector. The project will also construct a dam at Ilaan, in Sanaag region.

The project contains five outputs:

### **Output 1: Capacity building**

This output seeks to enhance MoLFD ability to initiate, deliver, and support the management of investments/projects. The project will provide capacity development to MoLFD to improve institutional performance and effectiveness of service delivery. Trainings to be delivered include project management and delivery, operations and maintenance and technical trainings. These trainings will enable MoLFD to plan, implement and sustain the interventions related to fodder production, animal health, general animal production.

## **Output 2: Community governance**

This output will Improve the community level governance and management capacity through enhanced participation, inclusion, transparency, and accountability. Lessons learned from SDF1 implementation show that community engagement is critical to the success of the projects. SDF recognizes the importance of early and continuing engagement and meaningful consultation with stakeholders therefore the project will conduct capacity assessment of the community structures and will support the development of the community engagement plans in each selected location and it will maintain and strength the communities and will provide group specific training depending on the outcome of the capacity assessment.

## **Output 3: Establishment of Aroori Livestock Centre of Excellence**

This output seeks to convert the current Aroori Livestock Holding Ground (LHG) to Aroori Livestock Centre of Excellence. The output will mainly be implemented in Aroori and its catchment areas. Aroori was previously an LHG and was developed under SDF1 LHG project as a pre-quarantine facility. It is now proposed to be converted into a Livestock Centre of Excellence (LCE). The key activities which will be implemented in the facility include:

- Intensification of the demonstration of fodder production inputs, like seeds, irrigation equipment and continuing rangeland reseeding and planting of fodder bushes and multi-purpose trees based on the own nursery
- Purchase of equipment
- Purchase experimental inputs for the LCE
- Construction of additional water facilities to expand current ongoing fodder irrigation demonstrations

## **Output 4: Support to fodder production and marketing in Xaaxi and establishment of livestock water point in Ilaan**

This output seeks to support the current fodder producers in Xaaxi area of Togdheer to increase the quantity, quality of the fodder and its effective marketing, hence improving their income. A minor output of the project is the construction of a livestock watering infrastructure in Ilaan area, Garadag district, Sanaag region. Apart from improved income, fodder produced from an estimated 400 ha of land, the output will contribute to the climate resilience via the soil and water conservation activities.

Key activities include:

- Provision of fodder production inputs, infrastructure, and training
- Establishment of demo center in Xaaxi
- Formulation of training modules for livestock keepers, fodder producers in various subjects and preparing the training manuals in both English and Somali
- Running ongoing extension and demonstration sessions for fodder producers

## **Output 5: Livestock disease surveillance, control and prevention measures improved**

This output concerns improving livestock disease surveillance, control and prevention measures through mobile clinics, better epidemiological knowledge, and follow-up measures for community animal health workers (CAHW). Under this component the project will:

- Purchase three vet mobile clinics
- Purchase data surveillance equipment
- Recruitment of Disease surveillance focal points
- Conducting disease surveillance, control and prevention survey and publishing disease surveillance booklets
- Support to the MoLFD to conduct CAHW study.

### 3. Objective of the assignment

The objective of this assignment is to conduct assessment and select an appropriate location for a dam in Ilaan and based on the selected site to prepare detailed designs, bill of quantities and technical specifications.

### 4. Key tasks

The key tasks under this assignment are expected to be conducted by a team of three Experts, namely, Dam Design Engineer, Geotechnical Engineer, and a Topographical Surveyor. The Dam Design Engineer will be the Team Leader for this assignment. The team will be expected to conduct the following tasks:

#### Task 1: Water demand estimation & projections

- Expert(s) shall review existing literature (SDF2 Livestock Project Proposal, Ilaan Dam Preliminary Dam designs, specifications and BOQ, etc).
- In consultation with the SDF Secretariat and Ministry of Livestock, calculate the demand for human, livestock etc required so as to size the dam and related structures at the project site.

#### Task 2: Selection of Ilaan dam site and preparation of preliminary designs

- A dam site was selected but this needs to be verified based on the reconnaissance and assessment by the Dam Design Expert and Geotechnical Expert (see related task 4).

#### Task 3: Topographic surveying of the catchment, dam sites and related structures

- Conduct of the dam site reconnaissance survey and select the most feasible site for the dam.
- Carry out a topographic survey, by means of a Total Station or Geodetic GPSs, to make the mapping and the contouring (spacing of contour lines maximum 0.5 m) of the catchment areas and the proposed dam site/s and other related structures such pipeline routes, water kiosks sites, animal troughs, sites etc.
- Upon completion of the surveying, the Expert shall produce the following deliverables:
  - a) General plans and profiles showing the infrastructure and alignment of the proposed catchment areas and the actual dam site. (These shall be prepared in AutoCAD format as well as superimposed on Google Earth. The plans and profiles shall show features such as rivers, streams, farms, valleys, marshy areas, gullies, rock (if visible) etc.)
  - b) Prepare a detailed plan and long section drawings:
    - Indicative long sections of proposed dam site/catchment with Google earth images in the background.
    - When preparing plans and profiles, the horizontal and vertical shall have a scale of 1Horizontal:1Vertical.
    - 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.
  - c) 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.

#### **Task 4: Geotechnical Investigations**

The scope of the required services for the Geological and Geotechnical investigations are preparation for geological and geotechnical works, including geological mapping, test pit excavation with excavator/drilling rig, collection, and preservation of soil samples and accurate logging of the soil profiles for proposed Ilaan dam. The Geological and Geotechnical Investigations include, but not limited to the following activities:

- Review of the existing pertinent geological/structural geological maps and reports, aerial photographs, and/or satellite images, topographic maps, etc. of the dam site and a reconnaissance site visit to the proposed Ilaan dam site.
- Produce detail investigation methodologies and reports.
- Carry out regional structural, geological and geomorphologic maps for the project at a scale of 1:25,000.
- Produce surface geological and engineering geological mapping at main project structure areas with relatively larger scales of up to 1:5000 when appropriate topographic base maps are made available with the topographic surveying program of the project.
- Advise the client on the appropriate machinery for excavation (preferably excavator or a drilling rig) and also assist in the preparation of technical specification required for procurement purposes.
- Determine the litho-stratigraphic succession and analyzing the geology and geological structures of the dam area and evaluating their effects.
- Undertake the appropriate number of exploratory test pits using excavators/drilling rigs to characterize the subsurface geological and structural conditions at the dam site and undertake in situ testing. The number and depth of test pits shall be determined based on the field visits and recommendations given by the dam engineer.
- Test pit excavation at the reservoir inundation area for determining the volume of overburden and existing reservoir natural blanketing material.
- Test pit excavations at engineering sites and borrow areas for construction material site identification and delineation to determine the types, quantity, and quality of local construction materials (sand, aggregate, stone and rockfill) at proximity to the structure sites; show also available access road routes on the location map.
- Collecting representative soil and rock samples from trial test pits and quarry sites required for physical and engineering properties determinations, bearing capacities of foundations, slope stability analysis, permeability estimation, piping through foundations and retaining structures.
- Laboratory testing of representative soil and rock samples of foundation and construction materials and determination of engineering properties as per international standards.
- Construction material appraisal and suitability evaluation.
- In consultation with the dam engineer, prepare detail designs of the excavations, filling, compaction, lining, and finishing required ensuring that the dams are able to retain water with minimum infiltration and indicate a recommendation of geotechnical design parameters.
- Producing reports (factual and geotechnical reports).

**NB:** The tasks for the execution of this assignment have been outlined as detailed as possible. However, the Geotechnical Expert shall bear in mind that the list of tasks and activities can by no means be considered as a complete description of the Expert's duties. It is the Expert's 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 Expert shall perform all work as necessary to meet the objectives of the project.

**Task 5: Preparations of preliminary dam designs**

- Conduct preliminary investigations and designs of Ilaan dam and related infrastructure.
- The preliminary designs include assessment of the dam location, dam catchment areas, the nature of soils/rocks and coverage, the runoff (mean and in exceptionally dry years), the storage capacity of the dam and the relative water availability in the year round (mean and exceptionally dry), type of dam, type of soil under the dam and excavation/foundation depths, expected dam’s siltation and life cycle, preliminary designs of dam embankment, spillway, etc.
- Note that the preliminary investigations shall include geotechnical investigation through drilling/digging to investigate type of soil/rock under the dam.
- It is also recommended that the Expert conduct testing quality of any surface water available in the area for a period to be recommended by the Expert to be sure of the quality.

**Task 6: Conduct stakeholder meeting/coordination workshop #1 in Hargeisa**

- To ensure stakeholder wide appreciation and ownership of the assignment outputs and recommendations, the Experts are expected to organize a coordination workshop to present the preliminary designs to SDF and Ministry of Livestock.

**Task 7: Preparations of final designs, costed BOQs and technical specifications**

- Based on the comments provided on the preliminary designs and outcome of the stakeholder workshop, the Expert shall prepare detailed designs of Ilaan dam and related structures. These include preparations of detailed drawings, detailed BOQs, technical specifications, cost estimates, and bidding documents.

**Task 8: Conduct stakeholder meeting/coordination workshop #2 in Hargeisa**

- After incorporating the comments in the final designs, the Experts are expected to organize a coordination workshop to present the final designs and outputs to SDF and Ministry of Livestock.

**5. Duration of the assignment**

The assignment is expected to be implemented over a period of 2.5 calendar months.

**6. Design team composition, individual inputs, and qualifications**

**6.1 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 Dam Design Engineer who is the assignment Team Leader.

<b>Expertise</b>	<b>Working days</b>
Team Leader/Dam Design Engineer	48
Geotechnical Expert	21
Topographic Surveyor	18

## 6.2 Team qualifications and experience

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

Expert	Key qualifications
Team Leader/Dam 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 1, 2, 5, 6, 7 and 8. 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"> <li>• At least a Master's degree in Water Supply Engineering, Civil Engineering (with Dam specialization) or closely related field.</li> <li>• Registered professional engineer with a recognized engineering body.</li> <li>• Demonstrated excellent command of spoken and written English.</li> </ul> <p><u>General professional experience</u></p> <ul style="list-style-type: none"> <li>• Minimum of 10 years' experience working in senior level in dam designs and dam supervisions in Sub Saharan Africa and/or East Africa.</li> </ul> <p><u>Specific professional experience</u></p> <ul style="list-style-type: none"> <li>• Minimum of 7 years' experience in design and construction dam projects.</li> <li>• Minimum of 7 years' experience in use of AutoCAD and other Dam design software.</li> <li>• Must have executed at least 2 similar assignments in the last 5 years.</li> </ul>
Geotechnical Expert	<p>The Geotechnical Expert (GTE) shall be responsible for delivering on all geotechnical related tasks under the assignment. The GTE will specifically be responsible for delivering task 4. The GTE will be expected to have the following qualifications and experience.</p> <p><u>Qualifications and skills</u></p> <ul style="list-style-type: none"> <li>• Bachelor's degree in Geotechnical Engineering or Civil Engineering.</li> <li>• Must be registered with a recognized professional body in the home country.</li> <li>• Demonstrated excellent command of spoken and written English.</li> </ul> <p><u>General professional experience</u></p> <ul style="list-style-type: none"> <li>• Minimum of 10 years' experience in conducting geotechnical investigations for large and complex projects similar in scale to Ilaan dam project.</li> <li>• Experience working within East and Horn of Africa.</li> </ul>

	<p><u>Specific professional experience</u></p> <ul style="list-style-type: none"> <li>• Minimum of 7 years conducting geotechnical investigations for water projects.</li> <li>• Must have carried out at least two similar (geotechnical investigations for water supply dams) assignments in the last 5 years.</li> <li>• Must be familiar with the use of computer-aided applications such as AutoCAD.</li> </ul>
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 3 and 4. The TS shall have the following qualifications and experience.</p> <p><u>Qualifications and skills</u></p> <ul style="list-style-type: none"> <li>• At least a Bachelor's degree in Surveying.</li> <li>• Registered with the relevant surveying body.</li> <li>• Demonstrated excellent command of spoken and written English.</li> </ul> <p><u>General professional experience</u></p> <ul style="list-style-type: none"> <li>• Minimum of 10 years' experience in land survey.</li> <li>• Experience working within East and Horn of Africa.</li> </ul> <p><u>Specific professional experience</u></p> <ul style="list-style-type: none"> <li>• Minimum of 5 years' experience in land survey for water projects.</li> <li>• Minimum of 3 years' experience in use of computer aided surveying software and AutoCAD and equipment such as Total Station and processing of survey data into reports.</li> <li>• Must have carried out at least two similar assignments in the last 5 years.</li> </ul>

## 7. Reports and reviews

In addition to the hard copies of the reports, an accessible secure link with soft copies of final reports, bill of quantities, drawings and technical specifications in easily editable versions (in Word, Excel, AutoCAD, 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. Dam site selection, detailed topographic surveying report and related drawings, and preliminary dam designs (including BOQs, drawings, preliminary cost estimate, etc)	3 hard copies + 1 soft copy	1.5 months after commencement of assignment
3. Conduct 1 <sup>st</sup> stake holder workshop		1 week after submitting preliminary designs

<b>Report</b>	<b>No. of Copies</b>	<b>Date of Submission</b>
4. Final Dam designs, design reports, final bill of quantities, final cost estimates, and technical tender documents	3 hard copies + 1 soft copy	2 months after commencement of the assignment
5. Conduct 2 <sup>nd</sup> stake holder workshop	Workshop report (not more than 6 pages)	1 week after submitting Final designs
6. Final dam designs, design reports, final bill of quantities, final cost estimates and technical specifications by incorporating comments	3 hard copies + 1 soft copy	2.5 months after commencement of the assignment

## **7. 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 their own equipment to complete the assignment with all the necessary software installed.

## **8. Fees and Allowances**

- Successful candidate for each position will be offered competitive daily fees.
- All fees will be paid after the completion and approval of the final report.
- The SDF Secretariat shall organise and pay for the Expert's accommodation, travel within Somaliland, and DSA as per SDF2 guidelines.

## **9. Duty of Care**

- The Experts will work under the overall Health, Safety and Security protocols of the SDF Secretariat.
- The Experts will be expected to provide insurance for health care, accidents, and other risks associated to the assignment. The SDF Secretariat/MoLFD shall be free from any liabilities arising from the same.
- The SDF Secretariat will share available information with the Expert on security status and developments in country where appropriate.

## **10. 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 Ilaan site, Sanaag Region, 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 for International staff in Hargeisa and during field visits to the project site. Local Experts are entitled for DSA and accommodation during field trips to the project site but not in Hargeisa.



# Annex 1: Proposed Dam site Location



Ilaan, possible dam site