



**REPUBLIC OF MOZAMBIQUE
MINISTRY OF PUBLIC WORKS, HOUSING AND WATER RESOURCES**



**WATER SERVICES AND INSTITUTIONAL SUPPORT PROJECT II
(WASIS II)**

IDA Grant. IDA D1100

HYDRO-MECHANICAL ADVISOR

Contract Nr. FIPAG/WASIS II/CON-38/20

TERMS OF REFERENCE

September, 2020

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Terms of Reference for

HYDRO-MECHANICAL ADVISOR

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Terms of Reference for HYDRO-MECHANICAL ADVISOR

1. BACKGROUND

1.1. General

The Republic of Mozambique has received a credit from the International Development Association toward the cost of the **Water Services and Institutional Support II Project (WASIS II)**, and it intends to apply part of the proceeds of this credit to payments under the Contract for the **Hydro-Mechanical Advisor**.

The Government of Mozambique (GoM) is implementing reforms in the urban water supply sector aimed at improving coverage, quality and efficiency of services. The reform program has involved the reorganisation of sector Governance mechanisms, which have facilitated a transition towards decentralised water supply operations and management, including service regulation, investment planning, and private sector participation in operations.

More specifically, the GoM has taken steps to provide for:

- Reduced operating costs and increased efficiency, particularly through involving private sector in operations for water supply services in 21 major cities; Maputo, Matola, Boane, Beira, Quelimane, Nampula, Pemba, Dondo, Chokwe, Xai-Xai, Inhambane, Maxixe, Tete, Moatize, Chimoio, Manica, Gondola, Lichinga, Cuamba, Angoche and Nacala;
- Tariff adjustments that support financial sustainability; and
- Establishment of a Regulatory Board for the sector, which considers both service quality and financial performance.

The GoM's implementation agency for the new urban water program is Fundo de Investimento e Património do Abastecimento de Água– FIPAG (Investment Fund and Water Supply Asset Holder).

FIPAG is responsible for the water system infrastructure in the 21 cities and for the future investment in the systems. The program for urban water supply also includes investments in rehabilitation, operation and maintenance of systems. It has the mandate to ensure that the public receives an adequate and safe water supply that meets Mozambique standards for health and hygiene (the public service obligation), and is empowered to ensure these systems achieve autonomous, efficient and financially sustainable water supply operations.

The WASIS II Project, supported by the World Bank, has its objectives to improve the performance, sustainability and coverage of water supply services in the cities of Beira, Dondo, Tete, Moatize, Nacala and Pemba.

The Greater Maputo Water Services project (GMWSP), also funded by the World Bank, is reaching the end of its construction period, requiring the start-up operation, testing and transfer

of the 60,000m³/day WTP, Pump Stations, Transmission main as well as various Distribution Centers and the Hydro-Mechanical Advisor should provide assistance during this period and at the end of the defect liability period.

2. SCOPE OF SERVICES AND SPECIFIC RESPONSIBILITIES

The Hydro-mechanical Specialist will be directly contracted to FIPAG for part time involvement over a period of two years. Some work can be done from his home office, but is required to visit Mozambique from time to time when he will be based in the FIPAG Head Office in Maputo. During his time in Mozambique, he will be required to visit the systems in all the cities under FIPAG's responsibility, including where FIPAG have on-going construction or projects to start, as required. He/she will be required to liaise closely with the FIPAG Central Services for Projects and Investments, Operations and Great Maputo Water Supply Project Office.

Key activities of the Hydro-mechanical advisor shall include but not be limited to the following, divided into activities to perform in Mozambique and also from his/her home office:

A. Services to be performed in Mozambique

Visits to Mozambique will be arranged from time to time. During this period in Mozambique the services of the hydro-mechanical advisor will be used as required by the needs at the time and would consist of at least the following activities:

- Visit various water systems in the cities for an assessment of the status of each element of the system in order to identify rehabilitation needs and changes required to improve the efficiency of the system, including energy consumption, in a cost effective way. This will include a review of the operation and maintenance of the system by the local staff and improvements required in this regard. Clear recommendations regarding preventative maintenance will be required for each system. The findings and recommendations shall be included in a water system report for each city, which shall also be presented to FIPAG in order to agree on the allocation of responsibilities for the implementation of the report's recommendations.
- The assessment and improvement of operations efficiency regarding reduction of energy consumption through the recommended use of more energy efficient equipment, as an important component of the assignment considering the burden of the electricity bill in water systems
- Assessment of the installation as well as any other electro-mechanical matters (telemetry, electricity supply, standby generators, etc.) regarding FIPAG's pump stations and distribution centers, offering recommendations for revisions and/or improvements;
- Visit ongoing works contracts and assist FIPAG to improve its day-to-day management and supervision of FIPAG's works contracts as well as improvement of Quality Control related to the hydro- electromechanical works;
- Assist with the testing and transfer of the 60,000m³/day WTP, Pump Stations, Transmission main as well as various Distribution Centers constructed in the Greater Maputo area.
- When visiting construction sites, participate to assess the fulfilment of specifications and installation under the projects and operation of all electro-mechanical equipment;

- Witness commissioning procedure of urban water systems, as requested, and make appropriate recommendations to ensure operational procedures including staff operation and maintenance training as well as safety provisions for operation of the plant;
- Train FIPAG head office and FIPAG operations staff members based on training programmes developed by the contractors regarding the operation of WTP, PS and DCs, to be reviewed and improved by the Hydro-Mechanical Advisor and thereafter on a day-by-day basis to transfer skills on hydro-electromechanical matters, and to assure their ability to execute their duties and tasks in an effective manner;
- A yearly follow-up visit to cities in order to assess the improvements made and identifies further shortcomings requiring rehabilitation, maintenance and improvement of operation. Again this will require a report for each city with recommendations, which shall be presented to FIPAG.

B. Services to be performed from home office, when requested

Apart from the time spent in Mozambique, the hydro-mechanical advisor will from time to time be contacted by e-mail or through Skype discussions to provide his expert opinion regarding the following actions, including others in his field that are not mentioned:

- Assist to review/improve TOR scope on E&M related services as well as provide a specialist opinion on regarding the electrical and mechanical (E&M) components of urban water systems in tender documents, especially Employer's requirements and specifications, in technical evaluation of work methodology proposals and in contract documentation;
- Give special attention and provide specialist response on the works contracts and design reports regarding the process design. This shall include specialist views and recommendations to FIPAG on the E&M layout, the effectiveness of the E&M works, construction methodology and related issues that could have a negative impact on the cost effective and sustainable delivery of potable water that meets all standards and health requirements;
- Assist FIPAG with comments on or approval of any Engineers proposal for design changes, variations or adjustments required during the implementation of the project;
- Review and comment on the proposed working plans related to installation of electro-mechanical components and related aspects as required in the project and for operation and maintenance;
- Review requests from the Contractors to interrupt water supply services if required and submit recommendations to FIPAG for appropriate action to ensure optimal water supply under these conditions.
- Other hydro-electromechanical task related to urban water system construction, operation and maintenance

3. OUTPUTS

- **Various Urban Water System Assessment Report per City**, as requested. The report shall address the status of each element of the system in order to identify rehabilitation needs and the changes required to improve the efficiency of the system, including energy consumption, in a cost effective way. This will include a review of the operation and maintenance of the system by the local staff and improvements required in this

regard. Clear recommendations regarding preventative maintenance will be required for each system. The findings and recommendations shall be included in a water system report for each city, together with a clear detailed work plan and methodology describing the needs identified during the inspection visits, training deliverables and periods to be spent in each city in order to improve the performance. This report shall also be presented to FIPAG in order to agree on the allocation of responsibilities for the implementation of the report's recommendations. The reports shall be improved by incorporating the comments received from FIPAG after the presentation of the report.

- **Various Yearly System Review Report per City**, as requested, to assess the improvements made and identifies further shortcomings requiring rehabilitation, maintenance and improvement of operation. Again this will require a report for each city with recommendations, which shall be presented to FIPAG. The reports shall also be improved by incorporating the comments received from FIPAG after the presentation of the report
- **Various Short Review Reports** in response to among others, the following requests for specialist opinion related to the E&M:
 - Review of ToRs;
 - Review of bidding documents, Employer's requirements, specifications, etc;
 - Technical evaluation of proposals, including the proposed methodologies;
 - Site visit report on E&M supervision and quality assurance;
 - Review of E&M design reports and works drawings
 - Review of proposed design changes, VOs, work plans;
 - Review of water supply interruption proposal
 - Contribution towards the annual Project Implementation Reports;
- **Generic Training Manual** for FIPAG staff on E&M operation, maintenance, preventative maintenance program and quality control. This process should be coordinated with FIPAG training Academy in order to improve training manuals already developed in this regard. The manual should consist of straight forward guidelines and forms for maintenance/efficiency surveys.;
- **Specific Training Program** for FIPAG staff, based on assessment report per city, to be implemented coordinating with FIPAG Training Center (Academia). The assessment report should provide guidance on the need for formal training (at the plant) and or on-the-job training during site visits.
- **E&M Plant Review Reports** to FIPAG on request;
- A brief **Assignment Report** at the end of the period including activities executed during the assignment, recommendations for further inputs and outputs produced;
- **Other documents**, reports, training materials, presentations, etc as and when required to meet the key responsibilities defined above.

4. QUALIFICATIONS AND EXPERIENCE REQUIRED

The Hydro-mechanical Advisor shall possess the following qualifications and experience:

- A degree in Electrical and Mechanical Engineering, with a minimum of 15 years of electro-mechanical experience in the urban water sector;
- Experience in at least 5 water production and distribution projects including the design and installation of hydro- electromechanical equipment (electrical water pumps, power supply systems, communication network, telemetry system, standby generators, etc) on which 3 was related to each of surface and groundwater abstraction, conventional water treatment plants, pump stations, water main protection and distribution centers;
- Experience over at least 5 years in the hand-on operation and maintenance of urban water production and distribution systems;
- Sound experience of working with electrically actuated systems, especially with VSD and PLC's command;
- Fluency in the English language both written and spoken, with particular emphasis on report writing and contractual correspondence. The working language, all reports and communications, will be in English and Portuguese. Therefore, Portuguese knowledge will be an advantage.
- Experience in FIDIC based contracts, familiarity with Mozambican national policies and procedures within the water sector as well as experience of externally funded projects (ADB, French Development Agency, Orio or World Bank).

5. TIME REQUIREMENTS

The Consultant will be required on a part-time basis for a total of 8 person-month (180 working days, of which 40 workdays will be allocated to the Greater Maputo Project) input over a 24 months period, following a work time schedule to be motivated and approved based on the assessment report per city. The time schedule should aim at the most productive use of the available time and shall be submitted together with the final assessment Report with the stakeholders inputs incorporated. The consultant will be allowed to work mostly from home, but when in Mozambique, will work from the FIPAG office in Maputo and do visits to various cities in Mozambique.

The Consultant will be required to visit Mozambique for at least 5 periods of approximately one month each, spread over the two years, as agreed at negotiation, and updated during the assessment report discussions. It should be noted that this service may start while the COVID 19 restrictions are still in place and that the trips could have to be adjusted in order to be as productive as possible within the restrictions and possible need for quarantine periods for a specialist from outside Mozambique.

6. REPORTING

All documents, correspondence, communications, etc related to the Project shall be in English language.

The Consultant will report formally to FIPAG's Director General, Mr. Victor Tauacale through the WASIS-II Project Coordinator and liaise with the FIPAG Operations Director, FIPAG Greater Maputo Water Supply Project Director and FIPAG Regional Directors, and their designated representatives and counterparts.

7. FORM OF CONTRACT AND PAYMENT

The Contract will be a time-based assignment for the provision of technical assistance. Payment will be based on Consultant's invoices which will be submitted as applicable, but not shorter than on a monthly basis, aligned with the delivery schedule of the results agreed in the contract and work schedule. Remuneration will be based on daily rates with separate values for working from home and working in Mozambique.

The payment of remuneration fees will be subject to local/withholding taxes of 20% on the gross remuneration amount and should be shown separately on the bid and in the monthly invoices. The withholding tax will be paid by FIPAG.

Reimbursable costs and miscellaneous expenses will be refunded for expenses actually and reasonable incurred, if provided for and accepted in the Financial Proposal. Applications for reimbursable expenses should be made on the basis of all-inclusive costs, which include accommodation, transport, subsistence, travel (including air travel to and from Maputo) and all other expenses. Transport between the place of accommodation and FIPAG office shall be the responsibility of the Consultant. Any travel to sites when required will be provided by FIPAG. If any travel away from Maputo is required, this and any overnight lodging will be paid for by FIPAG.

The total amount that will be paid to the Consultant for remuneration and reimbursable expenses shall not exceed the ceiling amount reflected in the Contract.