



Ministry of Environment and Energy
Republic of Maldives

TERMS OF REFERENCE

PROVISION OF WATER SUPPLY, SANITATION AND SOLID WASTE MANAGEMENT PROJECT

Technical Consultancy

Design of Water Supply Facilities, RO Plant and Storage tanks in 12 Focus Islands, Maldives

A. PURPOSE

The Government of the Republic of Maldives through the Ministry of Environment and Energy (MEE) is implementing “Provision of Water Supply, Sanitation and Solid Waste Management Project” financed by OPEC Fund for International Development (OFID) and intends to apply part of the proceeds for the selection of a full time Consultant to acquire technical assistance for survey, design, monitoring and implementation of development of Water Supply Facilities, RO Plant and Storage Tanks in 12 islands administered by Ministry of Environment and Energy.

B. INTRODUCTION

The Government of the Republic of Maldives through the Ministry of Environment and Energy (MEE) is implementing “as received financing from the OPEC Fund for International Development (OFID), and intends to apply part of the proceeds for the following services: An In-house Individual Consultant to Design of Water Supply Facilities, RO Plant and Storage tanks in 12 Focus Islands mentioned in Section – 4; Focus Islands of this TOR.

C. BACKGROUND

The Maldives consist of 1190 low-lying coral islands spread over an area of 90,000km² in the Indian Ocean. Nearly 200 islands are inhabited, around 90 islands are resorts, and the rest are uninhabited. There are 26 geographical atolls which are grouped into 20 administrative atolls.

A large part of the population in the Republic of Maldives lacks the access to safe drinking water and improved sanitation facilities. Rainwater is the main source of potable water in the inhabited islands but it is available only during rainy months of the year. This causes the island population to rely on groundwater for drinking and cooking during dry period, mainly through domestic wells.

Wastewater disposal systems in most of the islands are developed within the plot known as onsite disposal systems (septic tank and soak pits), with rare cases of offsite disposals (near shore outfalls). In densely populated island environments, the construction, operation and maintenance of these systems is complex, mainly due to the short distance between domestic wells and septic tanks/soak pits, and often suffer from poor performance due to various reasons which include the absence of or limited desludging. Some small bore sewer systems (SBSS) have been introduced, but they often malfunction, and usually convey raw sewage directly into the near shore lagoon.

Sanitation facilities are poorly designed and constructed, which results in the contamination of groundwater and lagoon with the sewage effluent.

The island communities have therefore been facing the problem of groundwater contamination due to improper sanitation and over-extraction of groundwater. For a number of years, population and development pressures have led to increasing groundwater extraction, resulting in the depletion of the freshwater lens in many densely populated islands, which in turn has led saline intrusion into the groundwater aquifer. Groundwater resources have also been at risk of bacterial contamination caused by effluent leakage and pollution migration from poorly constructed and maintained septic tanks.

D. Focus Islands

1. L. Gan

The island of Gan is situated in Laamu Atoll (Haddunmathi). The island has an area of 598 hectare. The island has a population of 2502 people with a density of more than 4.3 people per hectar.



2. Hdh. Vaikaradhoo

The island of Vaikaradhoo is situated in the Haa Dhaal Atoll (South Thiladhunmathi). The island has an area of 103 hectare. The island has a population of 923 people with a density of more than 8.7 people per hectare.



3. Hdh. Makunudhoo

The island of Makunudhoo is situated in the Haa Dhaalu Atoll (South Thiladhunmathi). The island has an area of 60.7 hectare. The island has a population of 1462 people with a density of more than 15.2 people per hectare.



4. Hdh. Kumundhoo

The island of Kumundhoo is situated in the North Maalhosmadulu Atoll (South Thiladhunmathi). The island has an area of 178.4 hectare. The island has a population of 1345 people with a density of more than 5.1 people per hectare.



5. Hdh. Nellaidhoo

The island of Nellaidhoo is situated in the Haa Dhaalu Atoll (South Thiladhunmathi). The island has an area of 29.7 hectare. The island has a population of 1153 people with a density of more than 24.2 people per hectare.



6. Hdh. Nolvivaram

The island of Nolvivaram is situated in the South Haa Dhaalu Atoll (South Thiladhunmathi). The island has an area of 221.1 hectare. The island has a population of 2172 people with a density of more than 24.2 people per hectare.



7. N. Holhudhoo

The island of Holhudhoo is situated in the Noonu Atoll (South Miladhunmadulu). The island has an area of 85.2 hectare. The island has a population of 2067 people with a density of more than 32 people per hectare.



8. R. Inguraidhoo

The island of Iguraidhoo is situated in the Raa Atoll (Noth Maalhosmadulu). The island has an area of 35.8 hectare. The island has a population of 1648 people with a density of more than 31 people per hectare.



9. B. Kendhoo

The island of Kendhoo is situated in the Baa Atoll (South Maalhosmadulu). The island has an area of 14.5 hectare. The island has a population of 1099 people with a density of more than 51 people per hectare.



10. K. Gaafaru

The island of Gaafaru is situated in the Kaafu Atoll (Male' Atoll). The island has an area of 10 hectare. The island has a population of 1186 people with a density of more than 49.5 people per hectare.



11. R. Maakurath

The island of Maakurathu is situated in the Raa Atoll (North Maalhosmadulu). The island has an area of 43 hectare. The island has a population of 1151 people with a density of more than 19.1 people per hectare.



12. N. Maafaru

The island of Maafaru is situated in the Noonu Atoll (South Miladhunmadulu). The island has an area of 114.3 hectare. The island has a population of more than 1060 people with a density of more than 6 people per hectare.



E. SCOPE OF WORKS

The Consultant will carry out the following tasks, among others:

Phase A1: Data collection – Complementary Diagnosis

- Identifying suitable locations for the integrated Water Supply systems in collaboration with the respective island councils.
- Carrying topographic and other necessary survey required for the design of Water Supply systems for each island.
- Defining the construction methods to be used island by island, depending on transport and access.

- Provide a sustainability plan and cost estimate for RO Plants, Storage tanks and water kiosk.
- Propose time saving methodologies for plant houses (e.g.: prefabricated plant house, container house, etc.).
- Propose revenue generating methods with estimated costs (e.g.: by using hydroponic garden, kiosks, vending machines, etc.).
- Propose methodologies to deliver the Supply and Installation of equipment and maintenance training process by the contractor.
- Based on the initial data the consultant shall prepare preliminary design report including the findings and submit to MEE for approval. The report shall address the following, but not limited to:
 - Integrated Water Supply System designed in a way that each component can be constructed separately with integration of the whole system at the final stage. i.e.; Rainwater Harvesting System, Reverse Osmosis Plant and Water Supply Network including house connections.
 - durability
 - capital costs
 - operation and maintenance costs
 - required land area
 - expertise required for operation and maintenance/Ease of operation and maintenance
 - environmental and social aspects
 - rainwater harvesting method during the rainy season and Desalination plant during sunny season

The Consultants shall collect existing data and carry out the necessary investigations to ensure that sufficient information is available to clarify uncertainty regarding the technical choices to be made. In his methodology, the consultant will precise his data acquisition methods:

- area covered by the investigations;
- duration and degree of accuracy of the measurements to be carried out;
- Members of staff in charge of interpreting the data collected.

Outputs of Phase A1

Report I will include at least :

- a. Preliminary Design Report (including the list of data collected and summary of relevant items enabling the solutions for choosing the initial component to be established

Phase A2: Detailed Design/ Drawings

The second stage will concern detailed design/ drawings of the water supply system for each island.

The Detailed Design Report shall contain:

Part 1 (Main report) will include: The detail design report should be in accordance with EPA guidelines. (Design criteria and technical specification for Water treatment and Supply system.)

Part 2 (Drawings): will include all the necessary designs and working drawings.

Part 3 (Bill of Quantities and Cost Estimate) will include a Bill of Quantities for each structure and then by type of works (earth, concrete, mechanical, electrical). The Consultant will here explain the unit costs as well as the percentage considered for miscellaneous and contingencies. Finally, cost estimation will be carried out on the basis of quantities and unit costs. The Consultant will keep this cost estimate confidential.

The capital costs shall be derived from the Bill of Quantities and unit rates developed from recent tender for works in the MEE, using either unit prices or cost curves and indexed to inflation. The minor items will be estimated using historic current rates and prices prevailing in the Maldives islands.

For the mechanical and electrical equipment, cost estimates will be prepared based on recent experience of the cost of similar work and / or quotations from internationally recognized manufacturers and suppliers. The cost estimates will allow for transportation and erection on site, all out-site costs and off-site overheads.

All the three parts shall be established separately for each island or combined as packages required by MEE.

- If and when required the Consultant shall provide technical expertise/ advice in other water and sewerage related matters.

Outputs of Phase A2:

Report II will include the detailed design of the 'selected solution for each island including:

- the Main Report;
- the Drawings
- the Bill of Quantities and Cost Estimate;

F. QUALIFICATIONS AND EXPERIENCE

1. Minimum master's degree in Civil Engineering, Water and Environment related field.
2. Minimum 5 (five) years general experience with 3 (three) years of specific experience in civil work/ designing and implementing water facilities system projects.

3. Should possess sound knowledge of computer aided design software/applications
4. Should be capable of providing leadership, motivation and training to the staff and stakeholders
5. Should have excellent command over English with proven communication and, presentation and negotiation skills
6. Work experience in Maldives in the area of water supply and sewerage design, implementation and project management.
7. Should have strong leadership, management and communication skills in presenting, discussing and resolving difficult issues and have ability to work efficiently and effectively with a multidisciplinary team.
8. Must be available to work in MEE with the PMU team up to 35 to 40 hours a week.

The successful individual must be willing to work for extended periods without direct supervision and travel routinely to islands within the catchment.

In addition, the individual's reputation of integrity and impartiality routed in independent from third parties shall be considered.

G. REPORTING OBLIGATIONS AND DELIVERABLES

1. The consultants should submit a Monthly report at the end of each month in a format agreed with the MEE representative. At the end of each quarter a consolidated report summarizing the events of the months preceding shall be submitted in place of the monthly report.
2. The Consultant is required to work with PMU 5 (five) days a week (between 0800 hrs. and 1600 hrs.) mainly coordinating with the Project Coordinator. Required to report to work in official attire.
3. Develop, implementation monitoring, supervision, inspection and evaluation checklist, guidelines and forms
4. Develop, Quality Control and Quality Assurance Plan
5. Develop, Guideline/ Instructions to the Contractor for Acceptance Tests, Completion or Temporary Acceptance Certificates
6. Develop, Guideline for Hand Over Process
7. Field Visit Reports – Submitted no later than 7 days after each field visit.

The consultants shall submit the following **deliverables** as per the agreed schedule with PMU.

1. Detail map showing all survey results in AutoCAD format
2. Preliminary Design Report
3. EIA Report as per Design guidelines of EPA
4. Detailed Design Report as per Design guidelines of EPA
5. Detail Design and Drawings
6. Bill of quantities, Engineer's Estimate and Technical specifications
7. Maintenance Cost Estimate of Plants & Storage tanks for 3 years

H. SCHEDULE FOR THE ASSIGNMENT

All surveying, preparation and submission of design documents should be completed within **6 months**.

I. SERVICES AND FACILITIES TO BE PROVIDED BY THE CLIENT

1. Office space and other facilities such as computers will be provided to the Consultant as required.
2. Travelling expenses and food and accommodation allowance for trips will be given.

J. EVALUATION CRITERIA

Evaluation of Curriculum Vitae and Financial Proposal of the individual will be evaluated as indicated below:

Criteria, sub-criteria, and point system for the evaluation of Full Technical Proposals are:

The number of points to be assigned to each of the above positions or disciplines shall be determined considering the following three sub-criteria and relevant percentage weights:

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1. Education and qualifications | [30%] |
| 2. Relevant Experience/ background (description of four similar projects/assignment and Value of such assignments with contract value of MVR 200,000.00 | [30%] |
| 3. General work experience of 5 (five) years | [15%] |
| 4. Experience in the region and language | [10%] |
| 5. Work plan and Methodology | [15%] |

The formula for determining the financial scores is the following:

$S_f = 100 \times F_m / F$, in which S_f is the financial score, F_m is the lowest price and F the price of the proposal under consideration.

The weights given to the Technical and Financial Proposals are:

T = [0.6], and

P = [0.4]

K. PAYMENT TERMS

Payments shall be made according to the following schedule:

Phase A1: Data collection – Complementary Diagnosis

1. 10% of the total contract price after signing the contract and submission of work plan/schedule
2. 10% upon submission of detail map showing all survey results in AutoCAD format
3. 15% upon submission of Preliminary Design Report

Phase A2: Detailed Design

4. 10% upon submission of EIA report as per Design guidelines of EPA
5. 15% upon submission of Detailed Design Report as per Design guidelines of EPA
6. 15% upon submission of Bill of quantities and Engineers estimate
7. 15% upon submission of Technical Specifications
8. Final 10% payment upon submission of Maintenance cost estimate of plants & sewerage tanks for 3 years

L. FEE PROPOSAL/ PRICE SCHEDULE

The consultant is expected to include in his/her proposal a lump sum fee in Maldivian Rufiyaa (MVR) for carrying out this task. The proposal, containing clear documentation on the methodology proposed and past experience, must be accompanied with detail breakdown of costs such as;

- reimbursable expenses
- a plan of activities
- an upto date curriculum vitae of the consultant

Note: All costs associated with domestic (sea/air) travel cost only to the field will be borne by the Project.

M. SUBMISSION REQUIREMENT

The following documents shall be submitted with the application for this position.

1. Letter of Expression of Interest (EOI)
2. A brief summary that demonstrates that the applicant is qualified to perform the services (including description of similar assignments, experience in similar conditions, availability of appropriate skills etc.)
3. Copy of Identification (Passport Copy or Identity Card)
4. Copies of Educational Certificates (copies taken from accredited original certificates)
5. CV of the applicant
6. Technical Proposal (Approach, methodology, work schedule etc.)
7. Financial Proposal (Professional fees inclusive of professional insurance, medical insurance, tax obligation etc., Remuneration and Reimbursable (if any) indicated separately) as in the FORMAT provided in the **ANNEX A**.

ANNEX A – PRICE PROPOSAL

MONTHLY FEE FOR ALL SERVICES FORMAT TO BE USED

| Remuneration | Unit | No. | Rate | Total |
|------------------------------------------------------------------------------------------------------|-------------|------------|-------------|--------------|
| <i>Professional fees inclusive of professional insurance, medical insurance, tax obligation etc.</i> | item | 1 | | |
| Total | | | | |

| Reimbursable | Unit | No. | Rate | Total |
|---------------------|-------------|------------|-------------|--------------|
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| Total | | | | |