Terms of Reference

For the hydraulic and electric connection of the new seawater boreholes to the existing seawater desalination infrastructure in Folegandros Island.

In the framework of
the "ZERO DROP" project

Funded by The Coca-Cola Foundation

1. Background and context

1.1. The ZERO DROP Project

The small arid islands of the Aegean Sea in Greece are under significant water stress, particularly in summer months, when seasonal tourism spikes water demand, jeopardizing local water and, consequently economic, security. Water resources abstraction is mostly accompanied by pumping and high energy costs, as well as significant environmental threats by groundwater depletion and desalination. Climate change impacts are also expected to aggravate the situation.

At the same time, tourism is becoming a key economic activity, accounting for 20% of national GDP and more than 80% of local economy. However, tourism is a water thirsty activity. With an average daily domestic consumption calculated in the country at almost 200 litres, the daily consumption of a tourist is estimated between 350-1.000 litres, depending on the lodging class and facilities.

In order to meet the water demand of locals and tourists, authorities engage usually in top-down solutions to increase water supply, often with high environmental impact, like desalination, overlooking sustainable management options like water efficiency measures, including loss reduction, rainwater harvesting, reuse, etc. and behavioral change towards water conservation. Global, as well as European, best practices point to water efficiency measures as significant contributors to sustainable tourism and development.

In this regard, GWP-Med developed the "ZERO DROP" concept and methodology, aiming to:

- Increase water efficiency, decrease losses and utilize every drop for local water security and climate change adaptation by deploying and showcasing appropriate solutions, from mainstream to innovative.
- Create awareness for users, tourists and citizens, on the value of water as key factor towards sustainability.
- Improve management of water resources through partnerships via increasing capacities, advancing advocacy, dialogue and knowledge sharing, with youth and gender engagement.

"ZERO DROP" is a 2-year project that will adopt one small Greek island to address water challenges in an integrated manner, as well as engage in activities beyond the project island to showcase

good practices and solutions. It will target, as priority, an island with water scarcity, which is a touristic destination and, preferably, has women mayor, and will apply an integrated approach to improve water efficiency in the tourism sector, one of the key economic and heavily water-reliant sectors, and to spread the message across various audiences and stakeholders.

The ZERO DROP approach includes:

i. Technical solutions,
ii. Educational activities,
iii. Youth engagement and gender mainstreaming,
iv. Capacity building & training,
v. Awareness raising,
vi. Advocacy

The "ZERO DROP Island" will aspire to constitute a powerful model for sustainable use of water resources in the tourism sector, adding value to the destination and reaching out to mindful tourists, setting a paradigm for blue and sustainable economy to locals, visitors and beyond.

1.2. The Island of Folegandros

The ZERO DROP project selected the Island of Folegandros for its operations as it matches the set criteria:

- Lack of water
- Woman Mayor
- Touristic destination

Folegandros Island is one of the most picturesque islands of the Cyclades Islands chain. Its wild natural landscape and peaceful atmosphere make this island a great destination. It boasts traditional Cycladic architecture. That means that its villages are made up of tiny, whitewashed houses, narrow alleys, and colorful windows.

The island of Folegandros has a population of 780 inhabitants (Census 2011) and has developed intensive touristic activities that provide the main revenue of the local economy. Specifically, the island has a hotel / rooms to let capacity of 3.000 beds and receives more than 45.000 per year. The touristic facilities operate with 100% capacity for 60 days or with 70 – 72% capacity for 120 days.

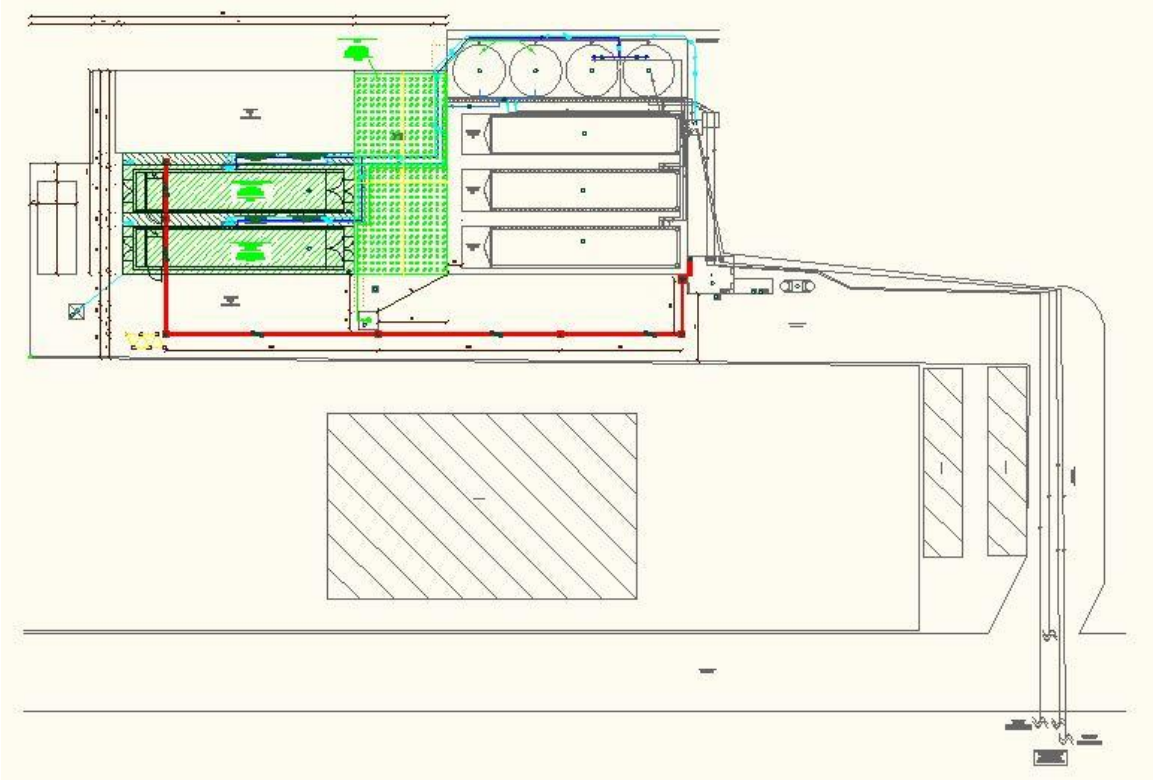
Water is essential for the maintenance and further growth of the tourism sector of the island. Generally, Folegandros Island continues to lack the necessary water quantity and quality to meet its needs. Efforts have been made in the past for both increasing water supply and reducing water demand.

Hoteliers highlighted the need for a broad awareness campaign targeting tourists, to make them aware of the island's struggle with water scarcity and to encourage them to save water in their lodgings. (It was mentioned that 'the sight of swimming pools in many facilities is giving the wrong impression of an abundance of water').

1.3. The Seawater Desalination Units in Folegandros Island

One of the major efforts of Folegandros Municipality towards meeting the needs of the various economic activities (with tourism being the most significant one) on the island, was the installation of seawater desalination units. Specifically, the island has five (5) installed units. Three (3) of those have the capacity to produce up to 300 m^3 of drinkable water per day while the other two (2), the newest ones (installed in 2020) have the capacity to produce up to 350 m^3 of drinkable water per day. Thus, the island's maximum capacity is 1.600 m^3 of drinkable water per day.

The units have been installed in the area of Karavostasi and their general allocation is pictured as follows:



The installation also includes four (4) plastic 20 m^3 tanks. Two (2) of those are being used to collect the raw seawater and forward it to the units for treatment while the other two (2) are being used to collect the treated water and forward it to the distribution network.

Currently, the units are being fed with seawater from two (2) seawater boreholes. Those have a total capacity of much less than 100 m^3 of seawater per hour. This means that the island is provided with a maximum production of 600 - 700 m^3 of drinkable water per day (depending on which unit operates each time). Indicatively, each unit requires 35 – 40 m^3 of seawater per hour in order to produce up to 15 m^3 of drinkable water per hour. The remaining water is being rejected (brine).

Thus, the island lacks the necessary infrastructure to exploit the maximum designed capacity of the installed units. Apart from water shortages, especially during the summer season, the lack of related infrastructure also causes much higher energy consumption (compared to the estimated / designed consumption) due to the frequent shutdowns and starts of the units. That also translates to much higher water costs for citizens and businesses compared to the costs generated under the smooth operation of the units.

1.4. The New Seawater Boreholes

Under the Zero Drop Project six (6) new seawater boreholes have been drilled in Folegandros Island. The purpose of those boreholes is to:

- Feed the existing seawater desalination units with approx. 38 - 40 m^3 of seawater / hour of operation.
- Be used for the disposal of approx. 24 m^3 of brine that is produced by the desalination process per hour of operation.

The drilling coordinates (EGSA 87) and the maximum depths, according to the related permit from the Water Authority of South Aegean are listed as follows:

Boreholes	Coordinates	Maximum Depth
B1	584444 A and 4052494 B	70 meters
B2	584450 A and 4052488 B	85 meters
B3	584457 A and 4052482 B	65 meters
B4	584428 A and 4052442 B	70 meters
B5	584444 A and 4052447 B	65 meters
B6	584430 A and 4052453 B	65 meters

The diameter of the drilling is 12 ¼". The three (3) of those boreholes (B1 to B3), which will be used to feed the seawater desalination units, have been piped with PVC piping of 10" and 10 atm. The remaining three (3) boreholes (B4 – B6), which will be used for the disposal of the produced brine, do not include piping.
Borehole B4 has not been widened and therefore will not be used.

2. Description of the Assignment

2.1. Objective

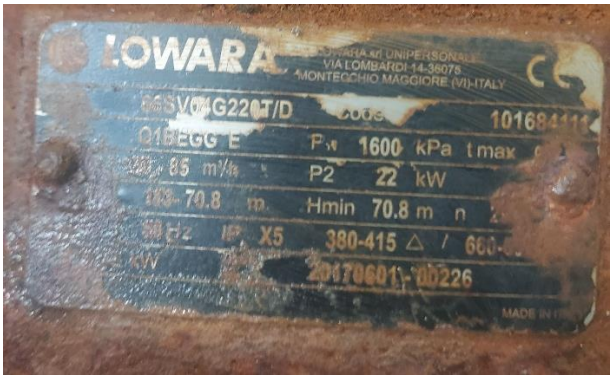
The location of the assignment is the Greek island of Folegandros.

The objective of the assignment is the hydraulic and electric connection of the new seawater boreholes to the existing seawater desalination infrastructure in Folegandros Island. The purpose of those boreholes is to:

- Feed the existing seawater desalination units with approx. 38 - 40 m^3 of seawater / hour of operation.

- Be used for the disposal of approx. 24 m^3 of brine that is produced by the desalination process per hour of operation.

The assignment also includes the Supply and delivery to Folegandros of a vertical, three-phase pump of equivalent features as the existing 66SV04G220T/D Lowara pump (provided pictures below). The new pump will be used as a spate to the existing one which forwards the permeate to the tank of Chora.



2.2. Required Services

A/A	Service / Task	Quantity
A. Connection of Well Pump		
A1	Supply and installation of one (1) submersible three-phase, well pump of 38 - 40 m^3/h at 50 - 55 m for borehole B1. ○ It should be placed at the depth of 45 – 50 m in the borehole. ○ The pump materials should be able to withstand the corrosive nature of seawater. ○ The pump should include a water meter to count the volume of water it forwards towards the seawater desalination units. ○ The pump should have an autonomous pillar type el. board which will be placed behind the Electric Company meters at the nearby housing unit (outdoors). ○ The maximum distance between the well and the housing unit is 70 m. ○ Origin: USA, Europe	Lump sum
A2	Electrical connection of the new well pump. The autonomous pillar type el. board will: ○ Receive power from the existing el. board inside the housing unit.	Lump sum

	○ Receive the high and low-level switch signals (for the operation of the pump) from the existing el. board inside the housing unit. The signals come from the seawater tanks installed near the desalination units.	
A3	Hydraulic connection of the new well pump to the seawater tanks. ○ Φ110, PN10, HDPE pipe should be used. ○ The maximum distance between the well and the seawater tanks is 60 m.	Lump sum
B. Connection of the Brine Disposing Well		
B1	Hydraulic connection of the desalination units' drainage to the new brine disposal wells. ○ The produced brine is collected in a manhole behind the 1st desalination unit (nearest to the seawater tanks) and is forwarded to the existing boreholes via gravity. ○ Φ125, PN10, HDPE pipe should be used for the connection of the manhole to the new brine disposal boreholes. ○ The distance between the brine disposal manhole and the new brine disposal boreholes is 110 m. ○ The new piping should exploit gravity as well.	Lump sum
B2	Road passing: ○ For the HDPE pipe to reach the brine disposal boreholes, it will have to pass below a 7 m wide road that connects the port to Chora. ○ Since this is the only road that connects the port to Chora, it must be restored after the passing of the pipe. ○ Additionally, the road traffic should not be compromised until the restoration of the road (e.g. by using metal ramps / covers).	Lump sum
B3	Construction of a manhole of 1.00 m x 1.00 m x 1.00 m for the receipt of the brine from the HDPE Φ125 piping and the allocation of the brine to the new brine disposal wells. ○ Piping with the same features should be used for the allocation of the brine.	Lump sum
C. Replacement of Existing Pump		
C1	Supply of a vertical, three-phase pump of equivalent features as the existing 66SV04G220T/D Lowara pump. ○ The new pump will be used as a spare to the existing one which forwards the permeate to the tank of Chora. ○ Origin: USA, Europe	1
D. Drawings		
D1	Final drawing of the hydraulic and electric connection	1

Notes:

The operation of the submersible borehole pump is based on the low- and high-level switches already installed in the seawater tanks. The respective signals will be received through the already installed el. board. The autonomous el. board for the submersible borehole pump will be of pillar type for outdoor installation and will include all the necessary operation and safety components.

2.3. Obligations

During the construction phase of the project, the following obligations are put into force:

- Removal of any vegetation, to be limited to the minimum degree required and exclusively for the construction needs of the project.
- All necessary measures to avoid any form of water pollution from solid waste, waste materials, mineral oils, etc. during the construction phase of the project, to be taken.
- All necessary measures (marking, fencing, etc.) to avoid accidents, to protect residents and workers from danger that may be created during the construction of the project, to be taken.
- Storage of materials, even temporary, outside the construction area is prohibited.
- After the completion of the construction, the rehabilitation of the construction area needs to be conducted.
- Pictures of the work progress should be collected and sent to GWP-Med.
- A final list of materials and equipment to be sent to GWP-Med.

2.4. Assignment Outputs

The outputs of the assignment are the following:

- The supply and installation of a submersible three-phase, well pump (as described in 2.2).
- The hydraulic and electric connection of the submersible well pump (as described in 2.2).
- The hydraulic connection of the brine disposal wells (as described in 2.2).
- The supply of a vertical, three-phase pump of equivalent features as the existing 66SV04G220T/D Lowara pump (to be used as spare).
- The drawing of the hydraulic and electric connection.
- Pictures of the work progress should be collected and sent to GWP-Med.
- A final list of materials and equipment to be sent to GWP-Med.

2.5. Reporting line

The contractor will work under the direct supervision of / and communicate directly with Dr. Nikolaos Skondras, GWP-Med Senior Programme Officer, who is serving as Project Coordinator for Technical Solutions. When not present, the contractor will be supervised by related technical personnel assigned by the municipality of Folegandros.
The Head of Water Authority of South Aegean or the Mayor of Folegandros Island might be present during the construction phase. They should have direct access to the project details.

3. Duration of the Contract

The assignment has to be completed by the 20th of July 2022.

4. Contract Price and Schedule of Payments

The maximum fee for this assignment is **53,000 EUR***. This amount includes all other costs, income taxes and any other amount payable or cost that may be required for the completion of the work/service, **including VAT**.

The schedule of payments is as follows:

- 100% payment upon satisfactory completion of the works

*The final payment will be issued upon measuring of the total works performed.

5. Guarantee

The Successful Contractor will provide a Guarantee on all equipment for a minimum period of 16 months against faulty workmanship and materials and on the operation of the system as a whole. If during this period any parts or equipment have to be changed (due to faulty workmanship and not due to the selected operation conditions), the guarantee on that part is to be renewed for another year from date of replacement. The initial guarantee as well as the replacement guarantee include the equipment cost (transfer, labour cost, taxes, insurance etc.).

6. Selection Criteria (Pass / Fail)

Successful participants must:

1. Provide a statement of adequate resources to perform the requested tasks
2. Provide a Graphic Works Schedule - Program of Works in the form of a Gantt Chart
3. Provide the datasheet of:
   - The submersible pump,
   - The vertical, three-phase, high pressure pump
4. Have Minimum ten (10) years of experience in related hydraulic and electrical installations.
5. Have Minimum five (5) years of experience in works including pumping equipment.
6. Have Minimum three (3) assignments of similar nature (installation of pumps), complexity and/or budget with the present one in the last five (5) years.

Failure to provide the minimum required qualifications is considered ground for disqualification.

8. Awarding Criterion and Evaluation Process

Award criterion is the Most Economically Advantageous offer with criterion the lowest price for offers satisfying the Selection Criteria.