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| **Cambodia Water Portfolio** | |
| **Phnom Penh** | **Cambodia** |
|  | |
| **Contract No. PRO-0056-KHM-WWS-0001** | |
|  | |
| **Non Revenue Water & Drinking Water Quality Assessment of Water Treatment Network in Cambodia** | |
|  | |
| **Contract Volume 2 -  Appendix 1 – Scope of Services** | |
|  | |
| **Between** | |
| **InfraCo Cambodia Water Pte Ltd (“ICWP”)** | |
| **and** | |
| **[Insert Consultant Name]** | |
|  | |
| **[Insert Date]** | |

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Appendix 1 Scope of Services

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# Introduction and Background

## Project Company

InfraCo Cambodia Water Pte Ltd (“ICWP”) (the **Client**) is a wholly owned subsidiary of InfraCo Asia Development Pte Ltd (“InfraCo Asia”). InfraCo Asia is a commercially managed infrastructure development and investment company of the Private Infrastructure Development Group (“**PIDG**”). InfraCo Asia plays a critical role in helping to originate innovative infrastructure opportunities and to structure projects so that they achieve a greater level of impact, making them more attractive to private sector investment and reducing transaction costs. InfraCo Asia funds and undertakes infrastructure development activities with a focus on socially responsible and commercially viable infrastructure projects that contribute to economic growth, social development and poverty reduction. InfraCo Asia is currently funded by four members of PIDG: The UK Department for International Development; the Ministry of Foreign Affairs of the Netherlands; the Swiss State Secretariat for Economic Affairs; and the Australian Department of Foreign Affairs and Trade. For more information on InfraCo Asia, please refer to [www.infracoasia.com](http://www.infracoasia.com).

## Background to the Services

1. The Client [InfraCo Cambodia Water Pte Ltd (“ICWP”)] is developing the Cambodia Water Portfolio (the **Project**) which is located in Phnom Penh in Cambodia (the **Country**).
2. InfraCo Cambodia Water Pte Ltd (“**ICWP**”), a wholly owned subsidiary of IAD is supporting Khmer Water Supply Holding Co. Ltd (“**KWSH**”), a Cambodia-based private water operator (PWO) established in 2013, on the development of their water stations and network. KWSH acquires and partners up with other licensed PWOs to manage water stations and networks that have the potential to increase the number of connections to households in the various service areas. The KWSH Portfolio currently comprises of 5 water stations across 4 provinces in Cambodia – Siem Reap, Kratie, Prey Veng and Takeo. KWSH has plans to expand the piped water network of existing water stations to cover up to 15,000 additional households in underserved, rural and semi-rural areas.
3. The Services will help KWSH to have actionable plans that KWSH management can work on to reduce Non-Revenue Water (NRW) for the existing networks (in turn increasing revenue, reducing operating costs and improving cash flow positions) and supporting KWSH in ensuring that water sold meets local and international standards on clean and safe drinking water.
4. The present status of development of the Project is as follows:
5. ***Map

   Description automatically generated***KWSH currently offers access to piped treated water in the non-urban areas of Cambodia under private sector model seeking to combine social impact with commercial returns. There are currently 5 water stations across 4 provinces in KWSH’s portfolio, located as per the map below.
6. KWSH plans to increase its coverage from the current ~17,000 households (as of August 2022) to 38,000 households in the next 10 years.
7. KWSH is currently in the process of installing roughly 70km of main pipeline and >430km of secondary pipeline at Tram Khnar, Sosor Sdom and Kampong Trabaek Stations.
8. The Client wishes to procure the services of a reputable consulting firm, or joint venture of such firms (the **Consultant**) to provide the services described in Section 3 [*Scope of Services*] (the **Services**).

# The Project

Details of the 5 stations are as follows (as of Jan 2023):

Cambodia

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Pouk** | **Chhlong** | **Tram Khnar** | **Kampong Trabaek** | **Sosor Sdom** |
| **Total Regular Connections** | 5,575 | 3,964 | 4,634 | 2,845 | 737 |
| **Total Large Connections** | 0 | 0 | 34 | 0 | 0 |
| **Total Pipe Network Length (m)** | 166,850 | 83,036 | 103,070 | 110,870 | 34,910 |
| **2022 Water Production (cbm)** | 833,481 | 587,012 | 1,072,991 | 470,590 | 54,270 |

# Scope of Services

## High Level Non Revenue Water (NRW) Assessment and Strategy

### Objective

The key objectives of the assignment are

1. to review the level of NRW in the existing water supply networks,
2. support KWSH in preparing a strategy to maintain NRW at an economic level into the future, and
3. build the capacity of KWSH in NRW management planning and implementation.

### Rationale

KWSH is currently in the process of expanding its water supply networks. The expanded network relies on the sound performance of the existing network, as all the new pipework will be connected to existing pipework. Providing adequate pressure and flow of the customers at the most remote part of the network is critical and can be compromised by (i) inappropriate hydraulic design, and (ii) high or increasing levels of NRW. High levels of NRW impacts on the effectiveness of both the existing and future network assets and the incoming revenue streams to finance operations and maintenance.

A due diligence by Arup (2022) was previously engaged and the study identified NRW as a key issue in the existing networks and recommended KWSH prepare and implement a NRW management strategy. NRW management is a specialist area requiring expertise to prepare the strategy and find a balance between selection of suitable materials and construction methods, condition monitoring and replacements, and ongoing monitoring.

The proposed approach involves selecting the network with the highest level of NRW based on available desktop data and producing a NRW reduction plan for that network in the first instance. The aim would then be for KWSH to lead the NRW reduction plan for the other networks with the consultant’s review/coaching. The consultant would then assist KWSH in the preparation of an overall NRW reduction plan for the broader business.

### Key Activities

1. Firstly, for the selected network (Pouk), which is the oldest station and has the largest existing network, undertake the following:
   1. Review available network asset data, operational data and NRW data
   2. Review specifications, designs and actual materials and equipment for NRW risk
   3. Review KWSH IWA water balance based on available monitoring/data and identify data gaps
   4. Visit the selected network site to collate available information and knowledge of KWSH staff
   5. Prepare monitoring plan and provide recommendations for monitoring equipment purchase
   6. Recommend suitable and if required, procure monitoring equipment (subject to Client approval)
   7. Update IWA water balance based on updated monitoring
   8. Identify operational procedures to support improved NRW management
   9. Identify design and material specification improvements required
   10. Identify condition monitoring, maintenance and replacement operating procedures required
   11. Prepare a NRW reduction plan for this first network, complete with activities, resourcing, materials/equipment, capacity development requirements and ongoing monitoring requirements
2. For another two networks, the consultant would coach/mentor the KWSH team in preparing a NRW reduction plan for each network.
3. Finally, the consultant would lead the collation of all plans into an overall NRW reduction strategy for adoption by KWSH. The strategy (and associated plans by network) would support KWSH in resourcing and budgeting for implementation of the strategy.

### Deliverables

The expected deliverables are:

1. Preliminary IWA water balance and monitoring plan (Network #1)
2. NRW Reduction Plan (Network #1)
3. Review of NRW Reduction Plans for Networks #2 and #3
4. Overall NRW Reduction Strategy

### Roles/Expertise

The assignment will require the services of a specialist international consulting engineering firm with demonstrated experience in non-revenue water management, strategy development and capacity building.

## Drinking Water Quality Management Plan (DWQMP)

### Objective

The key objectives of the assignment are:

1. to assess the available raw water and treated water quality data and identify compliance and health risks and risk mitigation measures,
2. to prepare a risk-based drinking water quality management plan for the networks, and
3. build the capacity of KWSH in drinking water quality risk management planning and implementation.

### Rationale

The overall project involves the upgrade of water treatment plants, pumping and electrical equipment, and expansion of networks to additional households and businesses.

The technical due diligence found that the water sources for KWSH’s water treatment plants are generally local waterways which are contaminated with nutrients from fertilizers, municipal wastewater and other polluting activities (e.g. industry, pesticides etc.). The DD also found that KWSH undertakes limited raw water quality monitoring to understand the risk of the source water and does not have a risk-based drinking water safety plan in accordance with the World Health Organization Guidelines for Drinking Water (WHO, 2017 ). WHO states that “The most effective means of consistently ensuring the safety of a drinking-water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in the water supply from catchment to consumer.

New customers will receive water treated at the existing and new WTPs, passing through the existing network and then through the newly constructed network. The water quality risks from source to tap are therefore critical in ensuring that customers receive safe drinking water.

The proposed approach involves selecting one network, and preparing the required drinking water safety plan for that network. Following after to support KWSH in preparing a template for other networks. The aim would then be for KWSH to lead the DWQMP for the other networks with the consultant’s review/coaching. The consultant would then assist KWSH in the preparation of the required policy and overall DWQMP processes for the broader business.

### Key Activities

Firstly, for the selected network (Pouk), which is the oldest station and has the largest existing network, undertake the following:

1. Review available raw water and treated water data, operational data, standard operating procedures and required standards
2. Visit the site to collate available information, knowledge of KWSH staff and overall site based and upstream risks
3. Identify risks and cost-effective risk mitigation actions for individual activities that impact on drinking water quality
4. Prepare an interim report for discussion and ensure understanding of existing compliance and risks
5. Identify potential water quality monitoring protocols and associated costs
6. Identify operations and maintenance procedures to support improved drinking water quality management
7. Identify design improvements required (e.g. raw water intakes, chlorine contact time, chlorine residence time in networks)
8. Prepare a DWQMP for the first network and present in a workshop format (potentially online)

For the other networks, the consultant would coach/mentor the KWSH team in preparing a DWSP for each network.

### Deliverables

The expected deliverables are:

1. Interim Report and Workshop on Existing System Performance and Risks (Network #1)
2. Drinking Water Quality Management Plan (Network #1)
3. Review of DWQPM for Networks #2 and #3
4. Overall DWQPM Strategy or Policy

## General

1. The Services and all deliverables shall be in compliance with the Applicable Laws, the World Bank environmental and social policies (the Safeguard Policies) and the IFC Performance Standards on Environmental and Social Sustainability and related Environmental, Health, and Safety General Guidelines, and the PIDG Health, Safety, Environmental and Social Management System (HSES-MS) Standards ([www.pidg.org](http://www.pidg.org)).
2. The Services shall be performed by the Consultant with all due diligence, efficiency and economy, in accordance with generally accepted techniques and practices commonly recognized by international professional bodies.
3. The Services shall be provided in accordance with the timeline stated in Contract Appendix 3 [*Time Schedule, Deliverables and Key Personnel*].
4. The Consultant shall provide all necessary information showing how the Services will be appropriately controlled and managed, including the following:
   * 1. Programme
     2. Organisational chart(s)
     3. Deliverables
     4. Reporting
5. Meetings
   * 1. The Consultant shall participate in meetings in relation to the Services when necessary.
     2. The Consultant shall be responsible for the preparation of agendas and records for all meetings, for review and acceptance by the Client.
     3. Meetings may be conducted in person, by telephone or video conference (Microsoft TEAMS) subject to agreement with the Client.

## Health and Safety Management

1. The Consultant shall abide by any relevant Cambodia regulatory requirements, including any particular health and safety issues or concerns that will need to be addressed in conjunction with the delivery of the Services.
2. The Consultant shall ensure that all project workers will maintain a safe working environment, including that workplaces, machinery, equipment and processes under the Consultant’s control are safe and without risk to health or safety.
3. The safeguarding of personnel and property shall be carried out in a manner that avoids or minimizes risks to the community’s safety and security.

## Reporting

Cambodia

1. The Consultant shall prepare and submit fortnightly progress reports with respect to the Services, and which shall include the following information:
2. Narrative summary of progress for the respective reporting period, broken down into the key activities.
3. Actual progress versus scheduled (baseline) progress and any action being taken to mitigate any identified delays.
4. Actual expenditure versus scheduled expenditure.
5. Issues, problems and concerns, and proposed actions already taken or being taken to mitigate.
6. Summary of activities and actions to be undertaken in the next reporting period.
7. Outline of any scope of work change proposals (variations) and the current status of any such proposals.
8. Summary of personnel actively working on the Services during the reporting period and their respective tasks.
9. Summary of health and safety statistical data (e.g. safety inductions undertaken, safety meetings, safety training, near misses, accidents, lost time injuries, etc.) and information on any health or safety issues or incidents.
10. Summary of any social or environmental issues or incidents.
11. Summary of any other issues or concerns for which information or action is needed from the Client.