



**water & sanitation**

Department:  
Water and Sanitation  
REPUBLIC OF SOUTH AFRICA

**BID W1054WTE**

**TERMS OF REFERENCE**

**AND**

**TECHNICAL SPECIFICATIONS**

WATER IS LIFE. SANITATION IS DIGNITY

## TABLE OF CONTENT

- Background & objectives
- Invitation for Bids
- Scope of work
- Requirements
- Technical specifications
  - Mechanical water flow meter
  - Ultrasonic water flow meter
  - Area velocity water flow meter
  - Drive-by hand held data collector
- Labour rates
- Transport costs
- Accommodation

W1054WTE

**DESCRIPTION**

**BID W1054WTE**

**SUPPLY, INSTALLATION AND MAINTENANCE OF  
ADDITIONAL SMART WATER FLOW METERING  
TECHNOLOGIES FOR THE DEPARTMENT OF WATER  
AND SANITATION FOR A TERM CONTRACT PERIOD  
OF THREE (3) YEARS**

- **Rate based contract**
- **As & when required**
- **CIDB 7 CE / ME (minimum)**
- **May appoint more than one (1) contractor**

## TOR: BACKGROUND & OBJECTIVES

- The Department of Water and Sanitation (“the Department”) is the custodian of South Africa’s water resources.
- The Department is primarily responsible for the formulation and implementation of water policy as well as overseeing water services provided by local government.
- The ambit of the Department scope is governed, inter alia by the National Water Act (No. 36 of 1998), which empowers the Department to recover its costs of fulfilling the obligations placed on the Ministry of Water and Sanitation from water users through raw water tariffs/charges.

**TOR: BACKGROUND & OBJECTIVES cont...**

- The National Water Resources Infrastructure (NWRRI) is responsible for the Development, Operations, Maintenance and Rehabilitation of National Water Resources Infrastructure Assets for the Department.
- It distributes bulk raw (untreated) water in terms of the National Water Act (No. 36 of 1998) to authorised users.
- The NWRRI Branch is endeavouring to become a Bulk Raw Water Management business unit.
- It is paramount that the costing of managing the supply of the water resource is based upon actual (verifiable) water use measurement.

**TOR: BACKGROUND & OBJECTIVES cont...**

- DWS has an existing contract (Bid W0815WTE) for the supply, installation and maintenance of “smart” Electro-magnetic water flow meters, for pipe diameters between 75mm to 600mm, which includes a suitable WEB-BASED software for monitoring and billing purposes.
- Therefore the main objective of this Bid is for the supply, installation and maintenance of other metering technologies, that are “smart” and can be easily monitored using the existing **WEB-BASED software**.

W1054WTE

## TOR: INVITATION FOR BIDS

- In accordance with the notice to all Bidders, each Bidder is required to submit the following copies before the closing date and time:
  - 1 X Original Bid document
  - 3 X Copies of original Bid document

**TOR: SCOPE OF THE WORK**

- Supply an array of additional “smart” water flow meters to address volumetric usage and verification of existing water abstraction conditions.
- Install, repair and maintain existing and/or new “smart” water flow meters and “smart” bulk water flow measuring devices.
- Supply, install and maintain wireless communication (monitoring system) devices for both “smart” water flow meters and bulk water flow measuring devices, feeding volumetric data to an existing WEB-BASED software.



**TOR: SCOPE OF THE WORK cont...**

- Construction of suitable reinforced concrete chambers or any other recommended structure, to prevent unauthorized access.
- Supply field water flow measuring or field verification devices to verify the accuracy of water meters for pipeline application.
- Make provision for high-level training of Departmental staff.

# Addition

- *Audit existing metering sites to verify asset ownership, functionality, and accuracy, as well as each new metering site to determine optimal meter sizing and location as per operational conditions.*

W1054WTE

## TOR: REQUIREMENTS: WATER FLOW METERS

CATEGORY	PARAMETERS	TYPE OF WATER METER TO BE USED
1	For pipe diameters less than 75mm or Annual water sales less than R100 000.00	Mechanical water flow meter
2	For pipe diameters 600mm and above or Insufficient space to properly install a Mechanical or Electro-magnetic water flow meter	Ultrasonic water flow meter
3	Gravity fed pipelines that are half full and Open channel	Area velocity water flow meter

W1054WTE

## TOR: REQUIREMENTS: MONITORING

CATEGORY	TYPE OF WATER METER TO BE USED	MONITORING DEVICE
1	Mechanical water flow meter	A suitable hand-held drive-by device for those areas where cellular phone coverage is dodgy  and  A suitable sensor with digital display unit and wireless communication to an existing WEB-BASED software
2	Ultrasonic water flow meter	
3	Area velocity water flow meter	

## TOR: REQUIREMENTS

The service provider must indicate the following:

- Submit technical details of how the meter offered Operates, Maintained, On-field and Off-field verification of accuracy.
- The prices for supply, installation and putting in operation the meters including the construction of meter chambers as required in unit cost.
- Annual maintenance costs of each meter type offered.

- The service provider must indicate the following:
- Annual on-field and off-field verification costs of each meter type offered.
  - Demonstrate compliance with the necessary standards of meters to be supplied.
  - A compulsory 12 month Guarantee of meter functionality, workmanship and that of repairs.

## **MECHANICAL WATER FLOW METER**

### **• OPERATION**

- The turbine type water meter shall be able to measure raw water flowing through the meter.
- The mechanical drive should be able to convert/translate the rotations into volume totalization displayed on the register dial face.
- Shall have provision to be read remotely and/or by a suitable drive-by hand held unit.

## **MECHANICAL WATER FLOW METER cont...**

- **CONSTRUCTION**
  - Meters shall consist of three basic components: Cast Iron Epoxy Coated main case, measuring element, and sealed register.
  - The measuring element assembly includes the rotor assembly, vertical shaft and a calibration vane which eliminates the need for calibration change gears.



## **MECHANICAL WATER FLOW METER cont...**

- **MAINTENANCE**
  - Water meter shall be engineered and manufactured to provide long-term service and operate virtually maintenance free.
  - If necessary the measuring element must be removable from the main body case for maintenance or replacement, without removing the entire body from the line.
  - Less than 5% accuracy required.

## MECHANICAL WATER FLOW METER cont...

- **STRAINERS**
  - All meters shall contain a removable polypropylene plastic strainer screen.
- **CONNECTIONS**
  - The meter shall come with companion flanges for installation of meters on various pipe types and sizes in bronze or cast iron
- **BROCHURE**
  - **All Bidders should attach product brochure that shows the full technical specifications.**

# **ULTRASONIC WATER FLOW METER**

## **GENERAL**

- **Type of flow meter required**      **ULTRA SONIC**
- **Mode of operation**      **TRANSIT TIME/TIME OF FLIGHT**
- **Pipe material**      **CARBON STEEL, PVC, FIBRE CEMENT, DUCTILE IRON, FRPM, GRP, ETC**
- **Pipe outer diameter**      **25mm to 8000mm**
- **Pipe wall thickness**      **1 TO 100mm**
- **Pipe internal lining**      **PAINTED, BITUMEN, EPOXY, ZINC.**
- **Average thickness of internal lining**      **LESS THAN 1 MM TO 50 MM**
- **Pipe outer cover**      **PAINTED, BITUMEN, EPOXY OR NONE**
- **Distance between transducers and signal converter**      **UP TO 300 m**
- **Fluid to be measured**      **RAW WATER**

## ULTRASONIC WATER FLOW METER cont...

### TRANSDUCERS

- Transducers to be used shall be of the non-wetted type and shall be externally mounted on the pipeline. No welding of any kind shall be allowed for the mounting of the transducers. All transducers shall only be attached to the pipeline with stainless SS306 or SS316 steel brackets. **TRANSDUCERS SHALL COMPLY WITH AN IP 68 RATING.**

### FLOW ACCURACY FACTORY

- Pipe Diameter 25mm to 8000mm
- Velocity:  $\pm 30$  to **0,8m/s**: **0.2 %** of reading.
- Velocity:  $\pm 0,8\text{m/s}$  to **1,0m/s**: **1.0 %** of reading.
- Flow velocity range: **+ and – 30m/s**
- Repeatability: **Less than 0,5 %** of full scale

## AREA VELOCITY WATER FLOW METER

### SCOPE:

- This specification covers an ultrasonic, area-velocity flow monitor. The instrument shall provide for indicating, transmitting, totalizing of the flow rate through partially filled or surcharged round pipes and rectangular, trapezoidal, egg or irregular shaped open channels.

### GENERAL:

- Flow monitor to consist of a submersible ultrasonic sensor, connecting cable and remote enclosure with indicating, transmitting and controlling electronics. Entire systems shall have no moving parts.
- Level measurement accuracy shall be  $\pm 0.25\%$  of Range. Velocity measurement accuracy shall be  $\pm 2\%$  of reading.

## TECHNICAL SPECIFICATIONS

**AREA VELOCITY WATER FLOW METER cont...****SPECIFICATIONS:**

- Detailed specification for both the sensing element and the transmitter are in the Bid document.

**PORTABLE UNIT AND TRAINING**

- **All Bidders should provide unit costs for a portable unit that will be used for on-field verification of meters in service, which will be used by our staff. Make provision for training DWS staff on the use of such a unit. Training may be per person and should include certification thereof.**

**BROCHURE**

- **All Bidders should attach product brochure that shows the full technical specifications of the meter being offered.**

## DRIVE-BY HAND HELD DATA COLLECTORS

- Drive-by handheld data collector(s) must be capable of reading all water flow meters throughout the Department.
- Data collectors must have the capability to collect and store meter readings through the use of an alphanumeric keypad and probing of water meters equipped with absolute encoders.
- Data collectors shall be able to obtain all types of readings on any particular route without requiring reprogramming of the handheld computer, physical change of software in the unit while in the field, or access through special software menus contained within a given route/program.

## TECHNICAL SPECIFICATIONS

### **DRIVE-BY HAND HELD DATA COLLECTORS cont..**

- In addition, the data collectors shall include communication cradles for charging and loading the handheld and probes for interrogating Sensor and other absolute encoder meters.

#### **BROCHURE**

- **All Bidders should attach product brochure that shows the full technical specifications of the drive-by handheld data collector being offered.**
- **DWS reserves the right to test, assess and inspect this unit whether by own staff or by a private Consultant/PSP**





## VEHICLE RATES (TRANSPORT COSTS)

- Tariffs as published by the Department of Transport (monthly)
- The maximum permissible vehicle rates to be claimed during the execution of this assignment are those equivalent to:
  - SEDAN/SUV/MPV : 1600cc (petrol or diesel)
  - LDV 4 x 2/4 x 4 : 2500cc (petrol or diesel)
- The utilization of vehicles with greater engine capacity than above shall be requested in writing, the Contractor shall indicate the benefit for to the DWS for consideration.

## ACCOMMODATION

- The Cost containment circular as updated from National Treasury shall apply.
- Contractors Mobile Accommodation (*furnish full rates and/or unit costs for these*). Failure to do so shall render this option none-available for the duration of contract.
- Approved Establishments (Hotel, Guesthouses etc.) A maximum of **R1,300.00** per person per night including dinner, bed, breakfast and parking shall be claimed.

W1054VTE

## TECHNICAL ENQUIRIES

**FURTHER TECHNICAL INFORMATION:** queries and questions of clarity can be addressed to Mr LAV Manus contactable as follows: Tel: 012 336 8092 email: [manusl@dws.gov.za](mailto:manusl@dws.gov.za) and cc [dlaminit2@dws.gov.za](mailto:dlaminit2@dws.gov.za). The **Bid number and the subject name** of this Bid should be clearly identified on the subject line when an enquiry is made.