

## ***INVITATION TO BIDDERS***

*Tender. No. NCSC-0004/16*

- 1. National Cement Share Company (NCSC)** invites any contractor for the drilling of deep water well depth of 250m (Bidder) under National Competitive Bid (NCB) for the scope of drilling, supply and installing the pump and commissioning.
- 2.** The complete set of bidding document can be downloaded from our website [www.nationalcementsc.com/bids](http://www.nationalcementsc.com/bids) and or collected from Addis Ababa office:

**National Cement Share Company**

**Ethio-china Friendship Road Wellosefer**

**KT-12 Building 1<sup>st</sup> floor**

**Tel: +251114421928/+251252110070**

**Cell: +251930102039/+25130283483**

**E-mail: [asmamaw.teshale@nationalcementsc.com](mailto:asmamaw.teshale@nationalcementsc.com)**

**or**

**[abdurehman.seid@nationalcementsc.com](mailto:abdurehman.seid@nationalcementsc.com)**

**Addis Ababa, Ethiopia**

Contractors may contact us directly through the above email and telephone for further information if any.

- 3.** Bid offer must be sent to our email address: [foreign.purchase@nationalcementsc.com](mailto:foreign.purchase@nationalcementsc.com) protected by multiple passwords of management before the closing date i.e. September 30<sup>th</sup>, 2016

## **PART ONE**

### **INSTRUCTION TO BIDDERS**

1. Bid offer must be sent to our email address: [foreign.purchase@nationalcementsc.com](mailto:foreign.purchase@nationalcementsc.com) protected by multiple passwords of management members or may submit Addis Ababa office before the closing date i.e. September 30<sup>th</sup>, 2016.

**National Cement Share Company**

**Ethio-china Friendship Road Wellosefer**

**KT-12 Building 1<sup>st</sup> floor**

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**E-mail: [asmamaw.teshale@nationalcementsc.com](mailto:asmamaw.teshale@nationalcementsc.com)**

**or**

**[abdurehman.seid@nationalcementsc.com](mailto:abdurehman.seid@nationalcementsc.com)**

**Addis Ababa, Ethiopia**

Bidders may contact us directly through the above email and telephone for further information if any.

2. The bid document is comprised of:-

- Invitation
- Instruction to bidders
- Bid Schedule
- Technical specification and bill of quantities.

3. Bidders shall examine the invitation to bid as well as all the attached specifications, instructions and bid schedules.

4. Each bidder shall furnish the information required by the bid document. The bidder shall print or type his name on the bid schedule and each continuation sheet thereof on which he makes an entry.

5. The following documents shall be completed and included with each bid.

- Warranty ( \_\_\_\_\_ )
- Delivery time ( \_\_\_\_\_ )
- Origin of the contractor ( \_\_\_\_\_ ) Or any other information

In addition, the bidder shall furnish illustrated literature, complete specification of the service with and facts to substantiate that the type of the services offered has been delivered for such use. The literatures, specifications and illustration shall be sufficient enough to permit complete technical analysis of the service bid up on and to check them against the technical specifications of this invitation to bid. The statement "COMPLY WITH YOUR SPECIFICATION IN FULL" Will not meet the requirements of this invitation to bid.

6. Bids shall be submitted by the contractor (Bidder) within 15 days after the first announcement of the tender during office hours. Opening of the bids shall be on the 16<sup>th</sup> day after the first announcement of the tender at 10:00 AM in the presence of bidders or their representative who choose to attend at National Cement Share Company in Dire Dawa office.

**PART TWO**  
**BID SCHEDULE**

To: National Cement Share Company (NCSC)

**Dire Dawa**

Dear Sirs,

Having examined the Bid documents for the contract of the services stated under your invitation to bid No \_\_\_\_\_. We, the undersigned hereby submit the following offer for the services listed below in accordance with the terms of the bid document issued by NCSC.

<b>S. No</b>	<b>Description of services to be provided</b>	<b>Unit of Measure</b>	<b>Qty</b>	<b>Amount</b>	
				<b>U/P</b>	<b>T/P</b>

\_\_\_\_\_  
Signature of the bidder

Date \_\_\_\_\_

# ***PART THREE***

## **TECHNICAL SPECIFICATION**

### **1. SCOPE OF WORK**

#### **General**

Drilling borehole 250m depth, the mechanical and electrical works i.e. supply, install and commission of Electro-mechanical components shall be performed on the following sites.

- a) Intake Wet well site
- b) Balancing Reservoir site
- c) Main Reservoir site

#### **1.1 Scope of the Works**

Under this contract the wet well will be equipped with three deep well type submersible pumps in a **HORIZONTAL INSTALLATION** and associated head works piping and electrical works.

Pedestal operated gate valve and strainer will be provided at the Bojebar spring inlet to the wet well.

A mono rail type crane mounted on an A-frame, for installing and removing the pumps will be installed on the top of the wet well. In addition chequer plates will be provided, to cover the openings on the wet well.

Radio receiver and transmitter units with antennas will be installed at the wet well and balancing reservoir sites.

One power supply generator shall be installed at the intake well site.

Installation of chemical disinfection equipment at the service reservoir site is included in the contract.

Associated and ancillary works required for the completion of the above works shall also be performed under this contract.

## **1.2 Ambient Conditions**

### **1.2.1. Altitude**

The approximate locations of the Works are indicated on the Employer's Drawings. The altitude of the works ranges from 1250 masl at the wet well to 1350 masl at the balancing reservoir.

### **1.2.2. Derating**

All items of plant at the works shall be derated for an altitude of 1,300 masl and a maximum ambient temperature of 38<sup>0</sup>C.

## **2. MECHANICAL PARTICULARS SPECIFICATIONS**

### **Submersible pumps and associated pipe work**

#### **2.1.1 Design Pump Duty**

The design pump duty point and required pump characteristics shall be as per the BOQ.

#### **2.1.2 Pump Type and configuration**

The wet well will be equipped with pumps that boost the raw water to the balancing reservoir.

The required pump type is a multi-stage, mixed flow type, electric motor driven, deep well submersible pump suitable for a **VERTICAL INSTALLATION AND OPERATION**. The submersible pump shall comply with the relevant clause of the general specification. The pump shall have a star delta type starter.

The pumps shall be protected against low water level in the wet well using an electrode probe (installed in the wet well) and a protection relay (installed in the

starter box of the pump compartment). The cable between the relay and the electrode probe shall be of the submersible type.

The pumps shall have a DN100 flanged connecting piece for connection to the collector pipe.

The pumps and associated equipment are to be derated for an ambient temperature of 38 degree Celsius and an altitude of 1200 masl.

The Pumps are to be selected to transfer water from any water level in the wet well to the receiving Reservoir, having due regard to the range of water levels and possible friction losses.

In particular;

- (a) When pumping against the maximum head the pump must have an adequate throughput for cooling
- (b) The selected pump must not overload its motor when pumping against the minimum possible head
- (c) The pump curves must be sufficiently steep to avoid excessive drawdowns when pipe friction losses are low
- (d) The selected pumps shall be free from cavitation at all times

The pump is to be provided with a non-return valve, isolating valve, air valve, pressure gauge and flow meter in the delivery branch. When the pump closed valve head exceeds the collector pipe work pressure, a pressure relief valve is also to be provided.

The metering instruments shall be calibrated in metric units namely, cubic meters for flow meters and m or bar for pressure gauge. The pressure gauge shall be connected with a three-way cock.

The valves shall comply in all respects, including class, testing, marking etc. to the relevant standards. The working pressure of the valves shall be suitable to the pump shut off pressure.

All pumps shall comply with the relevant clauses of the general specification.

Cooling sleeves or shrouds shall be fitted on the new pumps. The cooling sleeves shall be of such dimensions as to provide a minimum velocity of water flow past the motor as recommended by the manufacturer of the pump.

A mono rail crane mounted on an A-frame, manual hoist with an integral trolley of capacity 0.5ton, shall be installed including chain & all accessories required to fix the crane.

A surge vessel seized for the pipeline system will be installed on the common discharge pipe as shown in the drawings.

### **2.1.3 Riser and head works Pipe work**

Suction pipe work shall be of fabricated steel or ductile iron as specified, sized for a maximum flow velocity of 1.5m/s.

Delivery pipe work shall be of fabricated steel or ductile iron as specified, sized for a maximum flow velocity of 2.8m/s. The delivery branch from each pump shall incorporate a pressure gauge, non-return valve, and isolating gate valve, and shall connect to a manifold running the length of the pump station. The manifold shall be erected with the pipe invert running level, and shall incorporate a drain arrangement. An additional delivery branch closed with a blind flange shall be provided for connection of an additional pump in the future.

The valves shall comply in all respects, including class, testing, marking etc. to the relevant standards. The working pressure of the valves shall be suitable to the pump shut-off pressure.

All the valves & steel pipes shall be externally coated & internally lined with anti-corrosive paint preferably baked epoxy or equivalent. The protective painting shall be of a suitable quality to withstand corrosive water.

The pipe work shall be adequately supported & anchored to minimize bending stresses and to withstand hydraulic forces.



#### **2.1.4 Pump Control**

The submersible pumps will be automatically controlled from high and low level control probes installed in the wet well as well as low and high water levels in the balancing reservoir. The signals from the balancing reservoir are transmitted through a radio transmission unit at the reservoir and received by a receiving unit at the wet well. The motor control panel to be installed in the generator house at the wet well compound shall be provided with a start stop switch as well as provision for the indication of general fault and operation status.

The pumps shall also be provided with the following automatic cutouts, to stop the pump and indicate a fault, at the local panel.

- a. Low wet well water level
- b. High balancing reservoir water level
- c. High delivery pressure (closed valve);
- d. Phase failure;
- e. Over current;
- f. Under voltage, or
- g. Over voltage.

The pumps will be automatically controlled from high and low level control probes installed in the wet well and balancing reservoir and a high pressure switch which shall be installed on the delivery pipeline. The automatic operating sequence of the pumping units shall be as follows:

- balancing reservoir level – low, discharge pressure switch -- closed (delivery line pressure below pressure switch low setting), wet well level – not low ----- pump starts

- balancing reservoir level – low, discharge pressure switch -- open (delivery line pressure above pressure switch low setting)----- pump does not start
- balancing reservoir level – low, discharge pressure switch -- open (delivery line pressure above pressure switch low setting), wet well level – low ----- pump does not start
- balancing reservoir level – high, discharge pressure switch setting – any ----- pump stops
- balancing reservoir level – any, delivery line pressure above pressure switch high setting----- pump stops
- balancing reservoir level – any, wet well level – low -----pump stops

### **2.1.5 Scope of Supply**

The supply shall include the following items as indicated in the corresponding drawings;

- (a) Deep well submersible pump with power & control cables
- (b) suction & delivery piping
- (c) Non-return valves
- (d) Gate valves
- (e) Pressure gauge
- (f) Pressure switch
- (g) Surge tank
- (h) Piping to connect pump to the discharge (collector) pipe
- (i) Chequer plates and sundry pipe work

### **2.1.6 Scope of work**

The contractor's duties shall include;

- (a) Supply & Delivery of the equipment to site

- (b) Install, submersible pump with power & level control cables, control panels, collector pipe, pressure gauge, water meter, non-return valve, gate valve, etc at the wet well site and connect to the transmission pipe
- (c) Install level control units at the collector reservoir site.
- (d) Connect the pump power & control cables, radio receiver and transmission units to the panel boards in the pump room at the and conduct pump test
- (e) Running the whole system and Commissioning of equipment & training of the staff

### **3. ELECTRICAL PARTICULAR SPECIFICATIONS**

#### **3.1 Wet Well site**

##### **3.1.1 Submersible pump Motor Control Panel**

The panel shall be free standing/wall mounted with front access and cable entries from below. The starting method, and hence starter types, will be subject to approval.

Cables, both power and control, from the motor control panel to the submersible pump motor shall exit from the bottom of the panel and shall run to the upsets on suitably sized galvanized cable tray to the floor trenches.

The cables shall continue to run on cable tray or cable supports to the weatherproof termination cabinets at the head of the boreholes. All supports, cable tray, and fixings shall be supplied and installed under this contract, the Contractor providing details for approval.

Electric motors are to be sized to suit the maximum power that may possibly be absorbed by the pump, and are to be derated for ambient conditions, whilst limiting the temperature rise to that applicable for class F insulation. Starting current shall be limited

to 3 times the full load current and capacitors will be introduced if the power factor is below 0.84.

The control and protection arrangement shall be suitable for the type, size, duty, voltage and capability of the relevant motor. Starters should be capable of operating the relevant motor a minimum 15 times per hour, and suitable for remote automatic and local push button manual operation.

Star-delta type starters shall be of a current limiting type suitable for remote, automatic and local manual operation. The type of starter shall be selected with due regard to the nature of the load being driven to ensure that the starting current does not exceed 2.5 times the full load current. Current limiting starters shall be of the star delta type. Electronic soft start devices shall not be permitted. The number of starts per hours for each motor rating shall be stated. Details are to be included in the Data Schedules.

In general, each motor starter shall be equipped with the following basic equipment:

- a. Door interlocked, fault make/load break, on load, incoming main circuit breaker.
- b. Contactors which shall be of the air break type fitted with arc chutes, magnetic blow outs and heavy hard drawn copper main contact. Interlocks shall be provided to prevent simultaneous closure of the star and run contactors.
- c. Timing relay, where required, shall be electromagnetically-operated controlled timing of contactor sequence; a fully adjustable eddy current retarding mechanism shall be provided where necessary to suit the nature and conditions of the motor.
- d. Adjustable over voltage relay unit
- e. Adjustable under voltage relay unit
- f. Overload relay device suitable for adjustment with calibration plates scaled in amperes. A door mounted reset facility shall be provided
- g. Control circuit fuses and links

- h. Relay to protect against single phasing.
- i. Ammeter of the moving iron type mounted on the starter and operated by a current transformer, where justified by rating, and complete with phase selector switch.
- j. Provision for emergency stop button, float controls, etc..
- k. Anti-condensation heater with thermostatic control
- l. Supply on, Running and Tripped indicator light
- m. Test facility
- n. Hand/auto selector switches as required.
- o. Manual Stop/Start push-buttons

Each starter shall be provided with a test facility enabling the control circuits to be energized only when the starter isolator and cubicle door are open. It shall not be possible to close the cubicle door with the test facility still switched on.

High and low water level switches shall be provided to protect the dry running of the pumps and to initiate the starting and stopping of the pump sets.

High pressure switches shall be provided on the delivery pipeline to protect the pumps from abnormally high or low delivery pressures.

Low pressure switches shall be provided on the suction pipeline for booster pump sites to protect the pumps from abnormally low suction pressures.

The control and alarm panel sections of the motor control cubicles shall, in general, form an integral part of the motor control cubicles. The control/alarm panel section shall be supplied with all necessary lights, circuit protection, isolation switches, controls, and test button, to illuminate all lights and sound the alarm, and all other functions necessary to form a complete and composite unit.

In addition, a master, emergency, lock-off stop button shall be mounted on the panel the activation of which shall immediately shut down the borehole.

Illuminated lamps shall show the operation and fault status of each pumping unit. The relevant indicators will remain illuminated until the fault is checked and cleared.

### **3.1.2 Cables, Wiring and Accessories**

Armored power and control cables, together with bare copper earth wire conductors, shall be laid at the well site & booster pump site compounds.

All cable trenching shall be carried out under this contract as specified.

Cables to the submersible pump motor and controls shall be terminated at the weatherproof termination cabinets at the head of the boreholes. Tough rubber sheathed power and control cables suitable for the application shall be extended from the weatherproof cabinets to the submersible motor in the borehole, the cables being suitably supported.

Weatherproof termination cabinets shall be supplied and installed at the head of each borehole.

### **3.1.3 Electrical Installation in the Chemical Building**

The Contractor shall supply and install all control panels, emergency stops, controls, cables, wiring, accessories etc within the Chemical sheds to be built on top of the balancing and main reservoirs, to suit all specified requirements for the dosing plant.

The Control panels shall be suitable for the dosing plant supplied. Full details of the panels, single line diagrams, cable sizes, protection device ratings etc, shall be submitted for approval.

The location of the switchgear and control panels shall be subject to final agreement and to suit the existing cable ducts. Cable within the building shall be extended on galvanized cable tray.

#### **3.1.4 Scope of Supply**

The supply shall include the following;

- (a) Main LV switch board and pump control panel for the wet well pump sites having compartments
  - a. Power supply compartment with thri-phasic MCB of suitable rating, line & control fuses, phases indicator lamps, volt & ammeters with selector switches, KWH meter
  - b. pump compartment with TPN switch, star delta starters for each pumping unit, control transformer 380v/220v, under voltage & phase sequence relay, low water level protection relay, volt meter connected through a seven positions selector, ammeter connected direct on line, switches & relays for control & monitoring of booster pumps
- (b) Control & monitoring electrical panel board for the chlorination systems
- (c) Auxiliary distribution panels for the generator room
- (d) Weather proof termination cabinet at wet well and reservoirs
- (e) All necessary materials such as start & stop push buttons, signal lamps, terminals, earthing stud nameplates etc.
- (f) Earthing systems to comply with the relevant clauses of the general specification
- (g) Four core cable for connection to power supply generator connection

(h) Power & control cables, cable trays and other materials required for installation on site.

## ELECTRO-MECHANICAL EQUIPMENTS

<b>BILL 1-SUPPLY OF PLANT, WELL FIELD EQUIPMENT BH New</b>					
<b>Item</b>	<b>Item Description</b>	<b>Unit</b>	<b>Qty</b>	<b>Rate</b>	<b>Amount</b>
1.1	Submersible Pump Set, pump outlet DN 100, Q= 15 l/s, H= 250m, complete with motors and all necessary fittings and accessories as specified.	Set	1		
1.2	GS Flange 8", PN10, to be welded to the 8" steel casing		1		
1.3	GS Wellhead with a 8" flange, DN100 threaded and socketed short piece welded on the inside & DN100 short piece with a DN100 PN16 flange welded on the outside with all accessories as shown in the drawing & as per the specification		1		
1.4	Heavy class DN 100, length 3m galvanized steel socketed riser pipe (Class C)	Nr.	40		
1.5	DN 100 PN 10 galvanized steel double flanged elbow	Nr.	1		
1.6	DN 100 PN 10 galvanized steel double flanged pipe L= 2000 mm	Nr.	1		
1.7	DN 100 PN 10 flanged water meter, Qn= 60 m <sup>3</sup> /h	Nr.	1		
1.8	Pressure switch PN 16	Nr.	1		
1.9	Pressure gauge, DN25, (0-25) bar range, with isolating cock	Nr.	1		
1.10	DN 100 PN 10 galvanized steel double	Nr.	1		



	flanged pipe L= 500 mm				
1.11	DN 100 PN 10 flanged non return valve	Nr.	1		
1.12	DN 100 PN 10 dismantling piece	Nr.	1		
1.13	DN 100 PN 10 galvanized steel single flanged pipe L= 400 mm	Nr.	1		
1.14	DN 100/50/100 PN 10 all flanged tee	Nr.	1		
1.15	DN 50 PN 10 flanged gate valve	Nr.	1		
1.16	DN 50 PN 10 double orifice air release valve	Nr.	1		
1.17	DN 100/50/100 PN 10 all flanged tee	Nr.	1		
1.18	DN 50 PN 10 flanged gate valve	Nr.	1		
1.19	DN 50 PN 10 galvanized steel double flanged pipe L= 1000 mm	Nr.	1		
1.20	DN 50 PN 10 galvanized steel single flanged elbow	Nr.	1		
1.21	DN 100 PN 10 flanged gate valve	Nr.	1		
1.22	DN 100 PN 10 galvanized steel double flanged pipe L= 600 mm	Nr.	1		
1.23	DN 100 PN 10 galvanized steel double flanged elbow	Nr.	1		
1.24	DN 100 PN 10 galvanized steel double flanged pipe L= 2000 mm	Nr.	1		
1.25	DN 100 PN 10 galvanized steel double flanged elbow	Nr.	1		
1.26	DN 150/100 PN 10 flanged reducer	Nr.	1		
1.27	DN 150 PN 10 flanged socket	Nr.	1		
1.28	Pipe Support	Set	4		
	<b>Total Cost Carried to Summary</b>				

<b>BILL9-ERRECTION AND INSTALLATION</b>					
Item	Item Description	Unit	Qty	Rate	Amount

9.1	Erection, Testing, Commissioning and other incidental services at New Borehole, BH New	LS	1		
	<b>Carried to Summary</b>				