REPUBLIC OF KENYA

WRC SAFARI RALLY

PROPOSED CONSTRUCTION OF PRESIDENTIAL PAVILION AT KENYA WILDLIFE SERVICE PARK AT NAIVASHA

W.P. ITEM NO. D 113/ RV/NKU/2001 JOB NO.10850 A

VOLUME 7 OF 7

SPECIFICATIONS AND BILLS OF QUANTITIES
FOR
SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING
OF
BOREHOLE DRILLING, EQUIPING AND WATER TANKS WORKS

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VOLUME 7 OF 7

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TABLE OF CONTENTS

SPECIAL NOTES

1. These notes shall form part of the Instructions to Tenderers and Conditions of Contract.

2. The tenderer is required to check the number of pages in this document and should he find any missing, or in duplicate, or indistinct he should inform the Chief Mechanical Engineer (BS), Ministry of Transport, Infrastructure, Housing and Urban Development.

3. Should the tenderer be in any doubt about the precise meaning of any item or figure, for any reason whatsoever, he must inform the Chief Mechanical Engineer (BS), Ministry of Transport, Infrastructure, Housing and Urban Development, in order that the correct meaning may be decided before the date of submission of tender.

4. No liability will be admitted nor claim allowed, in respect of errors in the tender due to mistakes in the specification, which should have been rectified in the manner, described above.

5. All tenderers must make a declaration that they have not and will not make any payment to any person which can be perceived as an inducement to enable them to win this tender.

6. Any tenderer whose firm uses the titles “Engineer” and “Engineers” must produce evidence of registration of at least one of the directors by the Engineers Registration Board of Kenya to avoid disqualification.

SECTION A:

INSTRUCTIONS TO TENDERERS

TENDER EVALUATION CRITERIA

Note: The tenderer, who shall be domestic subcontractor to the Main Contractor upon award of the tender. Tenderers to refer to the evaluation criteria provided in Vol. 1 of the Tender.

SECTION B:

GENERAL MECHANICAL SPECIFICATIONS

SECTION D

GENERAL MECHANICAL SPECIFICATION

GENERAL MECHANICAL SPECIFICATION

2.01 General

This section specifies the general requirement for plant, equipment and materials forming part of the Sub-contract Works and shall apply except where specifically stated elsewhere in the Specification or on the Contract Drawings.

2.02 Quality of Materials

All plant, equipment and materials supplied as part of the Sub-contract Works shall be new and of first class commercial quality, shall be free from defects and imperfections and where indicated shall be of grades and classifications designated herein.

All products or materials not manufactured by the Sub-contractor shall be products of reputable manufacturers and so far as the provisions of the Specification is concerned shall be as if they had been manufactured by the Sub-contractor.

Materials and apparatus required for the complete installation as called for by the Specification and Contract Drawings shall be supplied by the Sub-contractor unless mention is made otherwise.

Materials and apparatus supplied by others for installation and connection by the Sub-contractor shall be carefully examined on receipt. Should any defects be noted, the Sub-contractor shall immediately notify the Engineer.

Defective equipment or that damaged in the course of installation or tests shall be replaced as required to the approval of the Engineer.

2.03 Regulations and Standards

The Sub-contract Works shall comply with the current editions of the following:

a) The Kenya Government Regulations.
a) The United Kingdom Institution of Electrical Engineers (IEE) Regulations for the Electrical Equipment of Buildings.
b) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.
c) British Standard and Codes of Practice as published by the British Standards Institution (BSI)
e) The Local Council By-laws.
f) The Electricity Supply Authority By-laws.
g) Local Authority By-laws.
h) The Kenya Building Code Regulations.
i) The Kenya Bureau of Standards

2.04 Electrical Requirements

Plant and equipment supplied under this Sub-contract shall be complete with all necessary motor starters, control boards, and other control apparatus. Where control panels incorporating several starters are supplied they shall be complete with a main isolator.

The supply power up to and including local isolators shall be provided and installed by the Electrical Sub-contractor. All other wiring and connections to equipment shall form part of this Sub-contract and be the responsibility of the Sub-contractor.

The Sub-contractor shall supply three copies of all schematic, cabling and wiring diagrams for the Engineer's approval.

The starting current of all electric motors and equipment shall not exceed the maximum permissible starting currents described in the Kenya Power and Lighting Company (KPLC) By-laws.

All electrical plant and equipment supplied by the Sub-contractor shall be rated for the supply voltage and frequency obtained in Kenya, that is 415 Volts, 50Hz, 3-Phase or 240Volts, 50Hz, 1-phase.

Any equipment that is not rated for the above voltages and frequencies shall be rejected by the Engineer.

2.05 **Transport and Storage**

All plant and equipment shall, during transportation be suitably packed, crated and protected to minimise the possibility of damage and to prevent corrosion or other deterioration.

On arrival at site all plant and equipment shall be examined and any damage to parts and protective priming coats made good before storage or installation.
Adequate measures shall be taken by the Sub-contractor to ensure that plant and equipment do not suffer any deterioration during storage.

Prior to installation all piping and equipment shall be thoroughly cleaned.

If, in the opinion of the Engineer any equipment has deteriorated or been damaged to such an extent that it is not suitable for installation, the Sub-contractor shall replace this equipment at his own cost.

2.06 **Site Supervision**

The Sub-contractor shall ensure that there is an English-speaking supervisor on the site at all times during normal working hours.

2.07 **Installation**

Installation of all special plant and equipment shall be carried out by the Sub-contractor under adequate supervision from skilled staff provided by the plant and equipment manufacturer or his appointed agent in accordance with the best standards of modern practice and to the relevant regulations and standards described under Clause 2.03 of this Section.

2.08 **Testing**

2.08.1 General

The Sub-contractor's attention is drawn to Part 'C' Clause 1.38 of the "Preliminaries and General Conditions".

2.08.2 Material Tests

All material for plant and equipment to be installed under this Sub-contract shall be tested, unless otherwise directed, in accordance with the relevant B.S Specification concerned.

For materials where no B.S. Specification exists, tests are to be made in accordance with the best modern commercial methods to the approval of the Engineer, having regard to the particular type of the materials concerned.

The Sub-contractor shall prepare specimens and performance tests and analyses to demonstrate conformance of the various materials with the applicable standards.

If stock material, which has not been specially manufactured for the plant and equipment specified is used, then the Sub-contractor shall submit satisfactory evidence to the Engineer that such materials conform to the requirements stated herein in which case tests of material may be partially or completely waived.

Certified mill test reports of plates, piping and other materials shall be deemed acceptable.

2.08.3 Manufactured Plant and Equipment – Work Tests

The rights of the Engineer relating to the inspection, examination and testing of plant and equipment during manufacture shall be applicable to the Insurance Companies or Inspection Authorities so nominated by the Engineer.

The Sub-contractor shall give two week's notice to the Engineer of the manufacturer's intention to carry out such tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The cost of such tests and inspections shall be borne by the Sub-contractor.

Six copies of all test and inspection certificates and performance graphs shall be submitted to the Engineer for his approval as soon as possible after the completion of such tests and inspections.

Plant and equipment which is shipped before the relevant test certificate has been approved by the Engineer shall be shipped at the Sub-contractor's own risk and should the test and inspection certificates not be approved, new tests may be ordered by the Engineer at the Sub-contractor's expense.

2.08.4 Pressure Testing

All pipe work installations shall be pressure tested in accordance with the requirements of the various sections of this Specification. The installations may be tested in sections to suit the progress of the works but all tests must be carried out before the work is buried or concealed behind building finishes. All tests must be witnessed by the Engineer or his representative and the Sub-contractor shall give 48 hours notice to the Engineer of his intention to carry out such tests.

Any pipe work that is buried or concealed before witnessed pressure tests have been carried out shall be exposed at the expense of the Sub-contractor and the specified tests shall then be applied.

The Sub-contractor shall prepare test certificates for signature by the Engineer and shall keep a progressive and up-to-date record of the section of the work that has been tested.

2.09 **Colour Coding**

Unless stated otherwise in the Particular Specification all pipe work shall be color coded in accordance with the latest edition of B.S 1710 and to the approval of the Engineer or Architect.

2.10 **Welding**

2.10.1 Preparation

Joints to be made by welding shall be accurately cut to size with edges sheared, flame cut or machined to suit the required type of joint. The prepared surface shall be free from all visible defects such as lamination, surface imperfection due to shearing or flame cutting operation, etc., and shall be free from rust scale, grease and other foreign matter.

2.10.2 Method

All welding shall be carried out by the electric arc processing using covered electrodes in accordance with B.S. 639.

Gas welding may be employed in certain circumstances provided that prior approval is obtained from the Engineer.

2.10.3 Welding Code and Construction

All welded joints shall be carried out in accordance with the following Specifications:

a) Pipe Welding

All pipe welds shall be carried out in accordance with the requirements of B.S.806.

b) General Welding

All welding of mild steel components other than pipework shall comply with the general requirements of B.S. 1856.

2.10.4 Welders Qualifications

Any welder employed on this Sub-contractor shall have passed the trade tests as laid down by the Government of Kenya.

The Engineer may require to see the appropriate to see the appropriate certificate obtained by any welder and should it be proved that the welder does not have the necessary qualifications the Engineer may instruct the Sub- contractor to replace him by a qualified welder.

SECTION C:

PARTICULAR SPECIFICATIONS

FOR

BOREHOLE DRILLING AND EQUIPPING

PARTICULAR SPECIFICATIONS FOR BOREHOLE DRILLING AND EQUIPPING

1. **Purpose**

The borehole to be drilled, constructed, test pumped and equipped with a submersible pump under this contract will be to provide water intended for domestic use. The maximum ground water abstraction permitted from the borehole shall be $90m^3$/day with the maximum abstraction period not exceeding 10 hours per day.

The execution of the works shall be in full compliance with relevant provisions of the Water Act.

The proposed drilling site will be at Naivasha. The Contractor is deemed to have visited the site at Naivasha, and if unable to locate it or its details apply to the Permanent Secretary, Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works State Department of Public Works, Ngong Road, Nairobi.

No claims will be allowed for the traveling or other expenses, which may be incurred by the contractor's works.

2. **Scope of the Work**

The works included in the contract consist of:-

(i) The drilling of one borehole of sufficient diameter to provide for a finished cased and screened borehole of 200mm diameter to the provisional depth of about 300metres.

(ii) The provision and installation of steel casings, steel screens, and gravel pack, borehole cap, together with cementation works necessary.

(iii) The collection of formation samples at 2 meter interval of drilling progress to the bottom and also water sample at every aquifer struck and at the beginning and at the end of test pumping operation for both chemical and biological analysis.

NOTE: - These depths and any other works can be varied by the Engineer depending on the actual conditions encountered in the process of executing of the works.

(iv) The supply and installation of 1No. Submersible borehole pump, complete with the necessary controls.

(v) Connection of the water from the borehole to the water storage tank.

3. **Local Conditions**

The borehole will be drilled, constructed and test pump in both unconsolidated and consolidated formation and the contractor must be prepared to carry out the required work through any type of formation in the project area.

4. **Borehole Data**

(a) Total depth – 300m of 200mm diameter from surface (**Provisional**)

(b) Casings to be152mm diameter and screened depth to be determined after borehole construction.

(c) Static water level – not known

(d) Dynamic water level – not known

(e) Recommended pumping rate – $8m^3$/hr (for the purpose of quotation but to be confirmed after testing)

(f) (Pump) setting level – 200m (for the purpose of quotation but to be confirmed after testing)

(g) Total dynamic head to be determined on site

5. **Casings**
   (a) Casings to be used as part of the permanent borehole structure shall be black steel pipe conforming to BS 1387 and having nominal diameter of 200mm.
   (b) If any casing other than that to be left permanently in the borehole is required temporarily for execution of work, it shall be supplied by the contractor at the borehole free of charge.
6. **Screens**
   The screens to be furnished and installed shall be of the pipe size variety having a minimum nominal diameter of 152mm and can be fabricated in three meter lengths. The screens shall be of continuous slot type and constructed entirely of stainless steel. The screen shall have slot size opening of 1.4m.
7. **Grouting**
   Grouting shall be done by either cement or bentomite to seal off unwanted upper aquifers under direction of the Engineer.
8. **Construction Method**
   The borehole to be constructed shall be drilled by cable-tool percussion method or the combination air/ hydraulic rotary method. The method of drilling shall be left to the discretion of the Contractor. After drilling to the final depth the Contractor shall proceed to insert permanent casings and screens as directed by the Engineer.

9. **Gravel Pack**
   If filter gravel will be necessary, it will consist of durable, naturally rounded quartzitic particles properly washed and cleaned prior to insertion in the borehole. The gravel shall be introduced in the annular space between the wall of the borehole and the 200mm casing from the bottom to about 2 meters below surface. The final casing and screens must be centralized before gravel back and the Contractor must supply suitable equipment for lowering of gravel pack.

10. **Cementation**
    The space above the gravel pack shall be grouted with a mix of one part of cement to two parts of sand and two parts of ballast, in order of 1:2:2 concrete may be used near the surface to form an annular plug around the casing of dimensions 1.0 x 1.0 x 1.0 meters. There shall be 2000mm diameter concrete plinth on top of the borehole and shall be constructed as shall be directed by the Project Engineer and the Structural Engineer.
    Any other cementation works to be done as directed by the Project Engineer.
11. **Development**
    The Contractor shall furnish all necessary pumps, compressor, plungers, bailing or other needed equipment and shall develop the borehole by such approved methods as shall be necessary to give the maximum yield of water per increment of drawdown and extract from the formation of maximum practical quality of such sands as may, during the life of the borehole, be drawn through the screens when the borehole is operating under maximum conditions of draw down.
12. **Test Pumping**
    After the borehole has been completed, constructed and developed, the subcontractor shall make necessary arrangements for conducting a 24 hour continuous test pumping up to a maximum of 30hr and 12 hour recovery test under the supervision of the Engineer. Where the Engineer or his representative cannot be present on such pumping test, the Contractor may continue without him keeping accurate records of the test in

terms of discharge and drawn down but must seek permission from the Project Engineer. Should the Contractor fail to keep such records, the Engineer shall order the test to be repeated at no extra cost.

13. **Sample Formation**

The Contractor shall keep an accurate record of the top and bottom of each stratum penetrated and shall save and deliver to the Engineer a sample of materials taken from each 1m of formation, or at every change of formation and at such other intervals as may be ordered by the Engineer. Those samples shall be placed in approved Contractor supplied containers with labels which indicate the depth at which the sample was obtained.

14. **Water Samples**

Water samples shall be collected at every water struck while drilling and also shall be collected at the start of every test and toward the end of the test in a three litre sterilized plastic container for both chemical and bacteriological analysis and submitted in a competent laboratory for analysis.

15. **Reports**

The contractor shall submit to the Engineer daily progress reports showing:-

(i) The depth each day indicating drilling in meters per hour with comments on degree of hardness of materials being penetrated.

(ii) Depth at which each water bearing zone is encountered and the rise and fall of water level in different formations.

(iii) The full details of work carried out in respect of operations which are paid for at hourly rate.

(iv) The full details of the number of hours worked each day.

16. **Cessation of Work**

The Engineer reserves the rights to stop drilling operations if in his opinion:-

(a) A sufficient supply of water has been obtained.
(b) The work is not being carried out in a satisfactory manner or
(c) Further drilling is unlikely to be advantageous or for any other reason

In this event, payment shall be made only for the amount of work done up to the date of stoppage.

17. **Retention Time**

Waiting time shall be such time as the whole of the drilling equipment and staff is on site and is available for use, and all the operation connected with the Contact are at a standstill due to the absence of instructions from the Engineer.

The request for the necessary instructions and/ or guidance to the Project Manager by the Contractor shall be within 48 hours, provided that the Project Manager does not delay the said instructions/ or guidance to the Contractor unnecessarily.

All claims for waiting time shall be made on the basis of a normal 8 hour day, including Sundays and Public holidays.

18. **Supply and Installation of Pump**

The Contractor shall supply and install:-

(a) One electric submersible pump which will conform to the specification stated, for operation on 415 volt, 3-phase.
(b) All necessary electrical equipment for the pump such as control panel with starter, ammeter, single phasing cut-out, low voltage cut-out and all necessary cables for connection.
(c) Suitable diameter Galvanized Steel pipe class 'C' to carry water to the surface/ to water storage tank
(d) Low level cut-out switch
(e) Airline 20mm galvanized steel pipe for water level measurements
(f) Pressure gauge
(g) The gate valves, non-return valves before the master meter
(h) Master meter for measuring the water from the borehole.

In addition the Contractor shall carry out 24 hours test run at the completion of the works. This test has to be certified by the Project Manager.

Note on Pump Installation

The Contractor shall make the necessary electrical connections and include in his prices all cable, starter-panel, switches etc. required to put the pump in operation while tendering for this part of the document and return it will full description literature and performance curves for the proposed equipment together with the tender for drilling works.

The installation of the submersible pump into the borehole shall be done immediately the borehole drilling is completed, test pumped and water analysed for suitability for human consumption.

The final production pump to be installed in the newly drilled borehole shall be determined and installed as per the actual conditions encountered on completion of the drilling works. Hence the specifications given under the section of 'borehole data' are only for the purpose of quotation. After establishing the actual conditions of the drilled borehole, only the engineer's approved submersible pump shall be installed.

19. **Electrical works**

It shall be the responsibility of the Contractor to provide all electrical wiring between all items of his Contract to ensure the correct function of his equipment. The Contractor's electrical works shall start from the nearest electrical isolator which will be supplied by others within five metres.

SECTION D:

PARTICULAR SPECIFICATIONS

FOR WATER TANK

PARTICULAR SPECIFICATION FOR THE DESIGN, SUPPLY AND ERECTION OF WATER STORAGE TANKS

1.0 Description of Site

The Sub-contractor is deemed to have visited the site at Naivasha and if unable to locate it or its details apply to the Principal Secretary, Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works Nairobi.

No claims will be allowed for the travelling or other expenses, which may be incurred by the sub-contractor's works.

2.0 Scope of Contract

The work to be carried out under, this sub-contract comprises the designs, manufacture, supply, delivery, erection, together with testing and commissioning of steel tank as here-in specified.

All work shall be performed in straightforward manner by competent workmen under skilled supervision to the entire satisfaction of the project manager.

3.0 Compliance with Regulations

The sub-contractor shall comply in all respects to the provisional and regulations of the By-laws of the Local Authority, Kenya Building Code, as 449 Part B5 1964. BS 4211, CP2 chapters V part 1 and 2 MOPW Structural steel work specification (1973) code of practice for design and construction of buildings and structures in Relation to Earthquake (1972) wherever applicable to the sub-contract works.

The Structural Engineer shall be responsible for the design of the foundation subject to giving approval of the sub-contractor's design of the tower and due allowance should be given for this work to be carried out in sub-contractor's programme of works. The main contractor is responsible for the construction of the foundation in accordance with approved designs.

4.0 Structural Drawings and Calculations

2No copies of general arrangement and fabrication drawings properly dimensioned and detailed showing the whole tower and its accessories together with 2No copies of the structural calculations complying with all the relevant BS and CP are to be submitted for approval prior to the commencement of the work.

The calculations are to indicate the maximum downward and upward loads on the foundations for the Engineer to design the foundation

5.0 Steel Water Tanks

The tank shall be galvanized pressed steel sectional tank complying in all respects to BS 1564 Types 1 or 2 unless otherwise specified. The jointing materials shall be non-toxic and non-insoluble to water and the tank cover shall be joined throughout the tank top ensuring that the joint is both water proof and dust proof.

Cover framing and members shall be designed to withstand supper imposed loading complying with the requirement complying with the requirements of CP2 Chapter V part 1 and BS 149 Part 2.

All internal stays are to be provided as required by the tank manufacture and the Sub-contractor shall be responsible for ensuring the stays are adequate in number and position and properly tightened. Access manhole with hinged cover together with a filtered vent outlet shall be installed.

The Sub-contractor is to notify the Engineer of the type of panel he is proposing to use and the manufacturer who is to be approved.

The inflow and outflow connection shall be as shown on the drawing.
The outflow supply pipe shall be at least 50mm above the tank bottom while the inflow pipe shall be 200mm below the tank rim. The overflow pipe shall be about 1500mm long, away from the tank. The drain pipe shall be at the lowest part of the tank.

5.1 Low Level Tank

It shall be constructed of 1000 x 1000mm galvanised pressed steel plates of 6mm thickness, having a capacity of 48,000 litres

Preferred Dimensions

(a) Length – 4.0m
(b) Height – 3.0m
(c) Width– 4.0m
(d) Plate thickness: – 6mm

5.2 High Level Tank

Tank Capacity: 18,000 litres. It shall be constructed of 1000 x 1000mm galvanised pressed steel plates of 6mm thickness.

5.2.1 Preferred Dimensions

(a) Length – 3.0m
(b) Width – 3.0m
(c) Height –2.0m
(d) Plate thickness: – 6mm

Height from ground level to the underside of the tank shall be 15 metres.
The tanks in clause 2 shall be complete with:

1. 65mm and 50mm diameter inflow connection (Council and Borehole Supply)
2. 100mm diameter outflow connection
3. 100mm diameter washout pipe
4. 100mm diameter overflow pipe
5. 1No. level regulator
6. 1No. Water level indicator
7. 1No. steel cover and manhole
8. 1No. internal ladder
9. 1No. external ladder to 3m off-ground level with cage
10. 1No. perimeter walkway and handrail around the tank

6.0 Pipework

The sub-contractor shall supply and fix all pipe work and fitting up to ground level as detailed on the drawing or in this specification. All pipe work shall be adequately supported and secured to the tank structure. The washout pipe shall have a bend leading to a reasonable place where the drainage will not interfere with the structure, preferably at about 300mm above ground.

The inflow, outflow and washout pipes shall be fixed against the tower structure so as to facilitate fixing and good support. All pipe work shall be medium grade galvanized steel and must conform to BS 1987 and 1967 class 'B'.

The sub-contractor shall provide high pressure ball valve capable of coping with the maximum area's local water supply pressure.

7.0 Access Ladder

Internal ladders shall be supplied for the tank and shall be fixed adjacent at the manholes but easily removable for cleaning the inside of the tank (i.e hooked connection).

The tanks shall be provided with an external ladder from the platform leading to the manhole and complying to BS 4211. The stringers shall be parallel, minimum width 15 inches apart and of flat bar of minimum dimensions 1½" by 2/8 inches. The rugs shall be of round bars not less than ¾ inches diameter and the distance between centres shall be 9 – 10 inches. The external ladder shall be fitted with safety hoofs made to conform to BS 4211.

The tower external ladder shall be as above but have a half landing 12M above ground level complete with a 6mm thick checked base plate and an appropriate protection safety handrail.

8.0 Platform

The tower, in galvanized steel, shall have a periphery walkway at tank level having minimum width of 600mm clear between the edge of the tank and the inside of the protective safety handrail. The platform is to be provided with a steel chequered plate floor of similar approved and to be completely sealed so as not to allow anybody or items such as bolts and spanners to fall on persons on the ground.

There shall also be a ladder from the ground to the platform complete with a cage, all in steel. The ladder shall be firmly fixed to the tower.
All loading for the design of the platform are to be provided in the structural calculations.

9.0 Painting

The tank shall be painted inside with one coat of bituminous non-toxic paint (or any other equivalent and approved) and on the outside with coat of primer before erection. After erection, the tank inside shall be painted with two coats of aluminium paint. The other structures shall be cleaned and painted one coat lead oxide or red lead before erection and two coats of aluminium paints after erection. All the painting shall be approved by the Engineer.

10.0 Erection

The sub-contractor shall erect the tank complete, on foundation prepared and designed by others and with all necessary pipes, ladders, tower etc. as listed herein and shown on the drawing.

The main contractor shall prepare the foundation to the sub-contractor's and Structural Engineers details. The main contractor shall also concrete or ground in the HD bolts to the sub-contractor's requirements.

11.0 Testing

Testing shall be done by filling the tank with water after erection. The water will be from the local supply and the main contractor shall apply from the Authority for connection. Testing shall be witnessed by the Project Manager or his representative.

11.1 Guarantee

The sub-contractor shall guarantee the tanks against leaks, and the tower for a period of (12) months form the Handover date. Any damage incurred due to bad workmanship shall be made good by the contractor.

SECTION E:

BILLS OF QUANTITIES

AND

SCHEDULE OF UNIT RATES

BILLS OF QUANTITIES AND SCHEDULE OF UNIT RATES

CONTENTS

SPECIAL NOTES

1. The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.

2. The prices quoted shall be deemed to include for all obligations under the sub-contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (**including 16% VAT**).

   In accordance with Government policy, the 16% VAT and 3% Withholding Tax **shall be deducted** from all payments made to the Tenderer, and the same shall be forwarded to the **Kenya Revenue Authority (KRA).**

3 All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part there of.

4. The brief description of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the sub-contractor shall adhere. Otherwise alternative brands of **equal** and **approved** quality will be accepted.

   Should the sub-contractor install any material not specified here in before receiving **written approva**l from the Project Manager, the sub-contractor shall remove the material in question and, **at his own cost**, install the proper material.

5. The grand total of prices in the price summary page must be carried forward to the **Form of Tender for the tender to be deemed valid**.

6. Tenderers must enclose, together with their submitted tenders, detailed manufacturer's Brochures detailing Technical Literature and specifications on all the equipment they intend to offer.

1. Statement of Compliance

a) I confirm compliance of all clauses of the General Conditions, General Specifications and Particular Specifications in this tender.

b) I confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

Signed: ……*for and on behalf of the Tenderer*

Date: ……..

Official Rubber Stamp: ……

BILLS No. 1

A) PRICING OF PRELIMINARIES ITEMS.

Prices will be inserted against item of preliminaries in the sub-contractor's Bills of Quantities and specification. These Bills are designated as Bill 1 in this Section. Where the sub-contractor fails to insert his price in any item he shall be deemed to have made adequate provision for this on various items in the Bills of Quantities. The preliminaries form part of this contract and together with other Bills of Quantities covers for the costs involved in complying with all the requirements for the proper execution of the whole of the works in the contract.

The Bills of Quantities are divided generally into three sections:-

a. Preliminaries – Bill 1

Sub-contractors preliminaries are as per those described in section C – sub-contractor preliminaries and conditions of contractor. The sub-contractor shall study the conditions and make provision to cover their cost in this Bill. The number of preliminary items to be priced by the Tenderer has been limited to tangible items such as site office, temporary works and others. However the Tenderer is free to include and price any other items he deems necessary taking into consideration conditions he is likely to encounter on site.

b. Installation Items – Other Bills

i. The brief description of the items in these Bills of Quantities should in no way modify or supersede the detailed descriptions in the contract Drawings, conditions of contract and specifications.
ii. The unit of measurements and observations are as per those described in clause 3.05 of the section

c. Summary

The summary contains tabulation of the separate parts of the Bills of Quantities carried forward with provisional sum, contingencies and any prime cost sums included. The sub-contract shall insert his totals and enter his grand total tender sum in the space provided below the summary.
This grand total tender sum shall be entered in the Form of Tender provided elsewhere in this document

BILL No. 1 PRELIMINARIES

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS	cts
1	Discrepancies clause 1.02					
2	Conditions of sub-contract Agreement clause 1.03					
3	Payments clause1.04					
4	Site location clause 1.06					
5	Scope of Contract Works clause 1.08					
6	Extent of the Contractor's Duties clause 1.09					
7	Firm price contract clause 1.12					
8	Variation clause 1.13					
9	Prime cost and provisional sum clause 1.14 (insert profit and attendance which is a percentage of expended PC or provisional sum.)					
10	Bond clause 1.15					
11	Government Legislation and Regulations clause 1.16					
12	Import Duty and Value Added Tax clause 1.17 (Note this clause applies for materials supplied only. VAT will also be paid by the sub-contractor as allowed in the summary page)					
13	Insurance company Fees clause 1.18					
14	Provision of services by the Main contractor clause 1.19					
15	Samples and Materials Generally clause 1.21					
	SUB-TOTAL CARRIED TO PAGE E-6					

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS	cts
16	Supplies clause 1.20					
17	Bills of Quantities clause 1.23					
18	Contractor's Office in Kenya clause 1.24					
19	Builder's Work clause 1.25					
20	Setting to work and Regulating system clause 1.29					
21	Identification of plant components clause 1.30					
22	Working Drawings clause 1.32					
23	Record Drawings (As Installed) and Instructions clause 1.33					
24	Maintenance Manual clause 1.34					
25	Hand over clause 1.35					
26	Painting clause 1.36					
27	Testing and Inspection – manufactured plant clause 1.38					
28	Testing and Inspection – Installation clause 1.39					
29	Storage of Materials clause 1.41					
30	Initial Maintenance clause 1.42					
31	Attendance Upon Tradesmen, etc. (Insert percentage only) clause 1.58					
32	Local and other Authorities notices and fees clause 1.60					
	SUB-TOTAL CARRIED TO PAGE E-6					

ITEM	DESCRIPTION	QTY	UNIT	RATE KSHS	cts
33	Temporary Works clause 1.63				
34	Patent Rights clause 1.64				
35	Mobilization and Demobilization Clause 1.65				
36	Extended Preliminaries Clause 1.66(see appendix on page C- 24)				
37	Supervision by Engineer and Site Meetings Clause 1.67	1	Item		300,000 00
38	Allow for profit and Attendance for the above				
39	Amendment to Scope of Sub-contract Works Clause 1.68				
40	Contractor Obligation and Employers Obligation clause 1.69(see appendix page C- 24)				
41	Any other preliminaries;				
	Subtotal above Subtotal brought forward from page E-4 Subtotal brought forward from page E-5				
	TOTAL FOR BILL NO. 1- PRELIMINARIEGS CARRIED FORWARD TO PRICE MAIN SUMMARY				

BOREHOLE DRILLING & EQUIPPING

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	NB: All measurements are provisional and are subject to re-measurements once on site.				
A	Allow for application and acquisition of permit for drilling from relevant authorities before commencing the works (Note: No payments to be made before the permit is acquired and submitted to the Client).	1	Item		
B	Mobilization/ demobilization of drilling unit, equipment materials, personnel and all other required supplies. It shall include erecting / dismantling of drilling unit.	1	Item		
C	Hydrological survey expenses	1	Item		
D	Drilling 200mm diameter borehole from 0-100m below surface.	100	LM		
E	Drilling 200mm diameter borehole from 101-200m below surface	100	LM		
F	Drilling 200mm diameter borehole from 201-300m below surface	100	LM		
G	Supply and installation of 152mm diameter plain steel casing.	200	LM		
H	Supply and installation of 152mm diameter slotted steel casing	100	LM		
I	Supply and installation of filter gravel pack	15	Ton		
J	Development works	12	Hrs		
K	Test pumping to ascertain borehole yield for at least 24 hours including installation and withdrawal of pumping unit and recovery measurements.	1	Item		
L	Construction of concrete plinth size 1.5mx1.5mx1.0m around well head.	1	No		
M	152mm diameter borehole capping	1	No		
N	Allow for all costs involved in providing water for all requirements of the contractor drilling field camp etc.	1	Item		
O	Water chemical and Biological analyses and borehole completion report.	1	Item		
P	Supply and install 40mm diameter galvanised steel water pipe (observation pipe), Class C.	300	Lm		
Q	Supply and install high quality pressure gauge as Kent or equivalent range 0-7kgf/cm² complete with accessories for mounting on galvanised pipe.	1	No		
R	Supply and install single orifice air valve, complete with pipe mounting accessories.	1	Item		
S	Supply and install 50mm diameter rising main GMS water pipe, Class C.	300	Lm		
	Sub-total C/F to collection page				

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	50mm diameter gate valve as 'pegler' or approved equivalent	1	No		
B	50mm diameter non-return valve as pegler or approved equivalent.	2	No		
C	50mm diameter galvanised steel bend	4	No		
D	50mm diameter water meter as 'Kent' or approved equivalent	1	No		
E	Supply and install a control panel to be mounted off the wall. The control panel shall be water tight with corrosion resistant from hinged lockable door metal enclosure and have Merlin Gerin swith-gear and Telemechanique control gear. The control panel shall have star-delta starter, phase failure, surge protector, isolator, voltemeter, ammeter, MCBs, 150m long float switch cable, float switch and any other necessary controls.	1	Item		
F	6mm² 4-core PVC round hardened PVC submersible electric cable. Waterproof.	300	LM		
G	2.5mm² 4-core PVC round hardened PVC electrode cables waterproof.	500	LM		
H	2.5mm² 4-core PVC/SWA/PVC cable from control panel to water tanks.	80	LM		
I	25mm diameter heavy gauge PVC ducts.	80	LM		
J	$10mm^2$x3 core underground cable	60	LM		
K	$1.5mm^2$x 2 core underground cable	60	LM		
L	Excavate trench of dimensions 300mm x 500mm to invert to lay cables. The laid cable to be covered with 50mm thick layer of fine soil, covered with tiles as "Hatari" then back fill and ram and dispose of excess	50	LM		
M	Electrode pair	2	No.		
N	Level regulator complete with mounting box	2	No.		
O	Supply and install 50mm diameter galvanised steel water pipe, Class C for supply of water to the storage tank.	50	Lm		
P	Allow for excavation to lay plumbing pipes to deliver water to storage tank installed by others, backfill and ram	50	LM		
Q	Allow for field labour and transport and also for the borehole equipment transport.	1	Item		
R	Allow for connecting 3-phase electric power to borehole pump (Power already on site) to conduct the necessary tests for the borehole equipment on site.	1	Item		
Sub-total C/F to collection page					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	Supply and install centifugal multistage borehole pump, continously rated and capable of pumping $10m^3/hr$ of water against a total head of 280m. The entire pump-set body, impellers, shaft etc shall be made of heavy duty stainless steel material. The pump shall have inbuilt non-return valve, tail strainer and cable guard. The pump shall be suitable for 3- phase 415V. The pump shall be as 'GRUNDFOS SP17-27' or equal and approved.	1	No.		
B	Allow for testing and commissioning of the borehole	1	Item		
C	Allow a Provisional Sum of **Ksh. 3,000,000** for borehole water treatment to potable standards after carrying out the chemical and bacteriological test.	1	Item	3,000,000	3,000,000
Sub-total C/F to collection page					

Collection Page for Borehole Drilling and Equiping		
	Description	**Cost (Ksh)**
1	Total from page E-7	
2	Total from page E-8	
3	Total from page E-9	
	Total Cost for Borehole Drilling and Equiping C/F to Summary Page	

HIGH & LOW LEVEL WATER TANK					
Item	**Description**	**Unit**	**Qty**	**Rate (Kshs)**	**Amount (Kshs)**
A	**High Level Water Tank** Supply, deliver and Assemble a High level water tanks, made of pressed steel **galvanized** sectional tank plates 6mm thick plates (type 1 and 4) and of size 1000mm x 1000mm capacity of tank to be 18,000 litres and of preferred dimensions 3000mm x 3000mm x 2000mm. The tank to come complete with tank cover, mosquito proof inspection vent, internal stays, jointing material, bolts and nuts including applying two coats of non-toxic bituminous paint on the inside and two coats of aluminum paint on the outside. The tank shall be complete with the following pipe connections:- -65mm diameter overflow -75mm diameter outlets -50mm diameter inlet -100mm diameter washout	No	1		
B	Float switch regulator	No	1		
C	Water level indicator	No	1		
D	Internal ladder	No	1		
E	External ladder from tank platform	No	1		
F	Galvanized tower ladder and protection cage of approximately 15metres high	No	1		
G	Galvanized platform with features described in the particular specifications.	No	1		
H	Galvanized steel tower 15 metres high with features as described in the particular specifications.	No	1		
I	50mm diameter high pressure ball valve	No	1		
J	**Ground Level Water Tank** Supply, deliver and Assemble a Low level water tank, made of pressed steel **galvanized** sectional tank plates 6mm thick plates (type 1 and 4) and of size 1000mm x 1000mm capacity of tank to be 48,000 litres and of preferred dimensions 4000mm x 4000mm x 3000mm. The tank to come complete with tank cover, mosquito proof inspection vent, internal stays, jointing material, bolts and nuts including applying two coats of non-toxic bituminous paint on the inside and two coats of aluminum paint on the outside. The tank shall be complete with the following pipe connections:- -65mm diameter overflow -65mm diameter outlets -50mm diameter inlet -100mm diameter washout	No	1		
	Total Carried Forward to the Summary page				

Item	Description	Unit	Qty	Rate (Kshs)	Amount (Kshs)
A	Float switch regulator	No	1		
B	Water level indicator	No	1		
C	Internal ladder	No	1		
D	External ladder from tank platform	No	1		
E	50mm diameter high pressure ball valve	No	1		
F	100 x 10 mm capping flat steel plate on all dwarf walls	Lm	50		
G	**BOOSTER PUMPS** Set of automatic electrically driven twin booster pump. One duty and the other one standby with automatic changeover , capable of delivering 9m³/ hr against a head of 35 meters with a three phase power source. It includes float switch regulator, time delay switch, a switch to protect against dry run, timer, gate valves and non-return valves. The pump to be as GRUNDFOS MODEL **CR 10-5** or approved equivalent. Pump to be installed on mild steel platform.	Set	1		
H	**Control Panel** Control panel for above pumps with contactors, over voltage and under voltage protection relays, MCBs, timer, start/stop push buttons, internal buttons with automatic changeover, 'running' and 'trip' neon lights control system and button for for change from automatic to manual operation. All these shall be housed in a lockable cabinet (with integral isolator) made from SWG 18 mild steel sheet that is oven powder coated . There shall also be an adjustable time delay switch to ensure pumping cycles are controlled to not more than 6 per hour, cables, low level cut-out switch in low level tank and regulator. Each pump should run for twelve hours per day.	Item	1		
	Control Cable				
I	Allow for wiring and conduit works for interconnecting cable between the pump control panel and the float switch.	Lm	50		
J	**Electrical Works** Allow for electrical works wiring and fitting to pumps, control panel and float switches from Isolator provided by others	Item	1		
	Total Carried Forward to the Collection page				

Item	Description	Unit	Qty	Rate (Kshs)	Amount (Kshs)
	ASSOCIATED PIPEWORK *Supply, deliver and install galvanized mild steel pipes to BS 1387 class 'B' with screwed and socketed joints to BS 134 and 1256 and of approved manufacturer with galvanizing to BS 729. Tenderers must allow in their pipe work prices for all the couplings, unions, connectors joints, holder bats, reducers etc. as required in the running length of the pipework and also where necessary for pipe fixing clips, plugged and screwed.*				
A	**Pipework** 100mm diameter G.M.S pipe	Lm	20		
B	75mm ditto	Lm	35		
C	65mm ditto	Lm	30		
D	50mm ditto	Lm	35		
E	**Gate Valve** 100mm diameter approved rising stem full way high pressure flanged gate valve with wheel and jointing to tubing	No	2		
F	75mm ditto	No	1		
G	65mm ditto	No	4		
H	50mm ditto	No	2		
I	**Sluice Valve** 100mm diameter Sluice Valve	No	0		
J	75mm dia. Sluice Valve	No	1		
K	50mm dia. Sluice Valve	No	0		
L	**Non Return Valve** 100mm dia. approved high pressure non- return valve to BS 1952. The non-return valve to be as "Pegler" or approved equivalent.	No	0		
M	65mm ditto	No	2		
	Drain Valves				
N	65mm diameter drain valve	No	2		
	Tees				
O	100mm diameter equal tee	No	2		
P	65mm ditto	No	2		
Q	100 x 65 mm unequal tee	No	1		
	Total Carried Forward to the Summary page				

Item	Description	Unit	Qty	Rate (Kshs)	Amount (Kshs)
	Bends/Elbows				
A	100mm diameter bend/elbows	No	4		
B	75mm ditto	No	5		
C	65mm ditto	No	4		
D	50mm ditto	No	4		
E	100mm diameter connecting flange	No	3		
F	Allow for water connection	Item	1		
	Valve Chamber				
G	Valve chamber size 750 x 750 x 600mm deep with 100mm concrete (1: 3: 6) base 100mm block sides rendered all round in cement and sand (1:4) and with approved hinged and flanged cast iron cover and frame including all necessary excavation, disposal and form work.	No	2		
H	Allow for excavation for the existing pipework at tee and valve points to connect with existing pipework.	Item	1		
	Indicator Plates				
I	Standard precast concrete Sluice valve marker post marked 'SV' set in concrete (1:3:6) base, including formwork, excavations backfilling and disposal. The plate to be painted with blue gloss oil paint.	No	2		
J	Testing and commissioning	Item	1		
K	Ream white photocopying paper A/4 80g/m2	Ream	20		
L	Letter head quality paper, size A4, 80g/cm^3, Green, 500 sheets	Ream	5		
M	Letter head quality paper, Blue, 500 Sheets as Classic or Conqueror or approved equivalent.	Ream	5		
N	HP Leserjet Print Cartridge serial 5A No. CE505A	No.	5		
O	Tablet with 9.7 inch retina LED backlit display, 128GB internal storage, WIFI, Bluetooth and 4G enabled, Front and Back camera of 12 megapixels minimum complete with a book cover as 'I PAD PRO'.	No.	2		
	Total Carried Forward to the Collection page				

COLLECTION PAGE FOR HIGH AND LOW LEVEL WATER TANK

Item	Description	Amount (Kshs)
1	Total amount brought forward from page E-11 ……	
2	Total amount brought forward from page E-12 ……	
3	Total amount brought forward from page E-13 ……	
4	Total amount brought forward from page E-14 ……	
	Total for High & Low Level Tanks and Booster Pumps C/F to Summary page	

SUMMARY PAGE		
Item	**Description**	**Total Cost (Kshs)**
1	Total for Preliminaries and General Items ……	
2	Total for Borehole Drilling and Equiping from collection page ……	
3	Total for High and Low level water tanks collection page ……	
4	Contingency Sum to be used at the discretion of the Engineer. ……	**500,000.00**
Total Cost for Borehole Drilling, Equipping and Water tanks C/F to Main Summary.		

SECTION F:

TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED

CONTENTS

TECHNICAL SCHEDULE

1. General Notes to the Tenderer

1.1The tenderer shall submit technical schedules for all materials and equipment upon which he has based his tender sum.

1.2The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings described in the technical schedules. Manufacturer's literature shall be accepted. Failure to comply with this may have his tender disqualified.

1.3Completion of the technical schedule shall not relieve the Contractor from complying with the requirements of the specifications except as may be approved by the Engineer.

TECHNICAL SCHEDULE

The tenderer must complete in full the technical schedule. Apart from the information required in the technical schedule, the tenderer **MUST SUBMIT** comprehensive manufacturer's technical brochures and performance details for all items listed in this schedule (fill forms attached).

ITEM	DESCRIPTION	MANUFACTURER	COUNTRY OF ORIGIN	REMARKS (Catalogue No. etc.)
A	Borehole Pump			
B	Gate Valves			
C	GMS Pipes			
D	Booster pump			

Catalogue must be attached for all the items in the schedule of material above

SECTION G:

DRAWING SCHEDULE

CONTENTS

DRAWING SCHEDULE:

As shall be provided during project implementation.

SECTION H:

STANDARD FORMS

STANDARD FORMS

CONTENTS

NOTE: **ALL FORMS IN THIS SECTION MUST BE FILLED AS THEY SHALL BE PART OF THE EVALUATION CRITERIA**

KEY PERSONNEL

Qualifications and experience of key personnel proposed for administration and execution of the Contract.

POSITION	NAME	YEARS OF EXPERIENCE (GENERAL)	YEARS OF EXPERIENCE IN PROPOSED POSITION
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

I certify that the above information is correct.

…….. …….. ……. ……..……

Title Signature Date

CONTRACTS COMPLETED IN THE LAST FIVE (5) YEARS

Work performed on works of a similar nature and volume over the last five years.

PROJECT NAME	NAME OF CLIENT	TYPE OF WORK AND YEAR OF COMPLETION	VALUE OF CONTRACT (Kshs.)

I certify that the above works were successfully carried out and completed by ourselves.

…… …… ……..

Title Signature Date

SCHEDULE OF ON-GOING PROJECTS

Details of on-going or committed projects, including expected completion date.

PROJECT NAME	NAME OF CLIENT	CONTRACT SUM	% COMPLETE	COMPLETION DATE

I certify that the above works are currently being carried out by ourselves.

……. ……..…… …….

Title Signature Date

DETAILS OF LITIGATIONS OR ARBITRATION PROCEEDINGS IN WHICH THE TENDERER IS INVOLVED AS ONE OF THE PARTIES

1. ._____.
2. ._____
3. ._____.
4. ._____.
5. ._____.
6. ._____.
7. ._____.
8. ._____.
9. ._____.
10 ._____.

SCHEDULE OF MAJOR ITEMS OF CONTRACTOR'S EQUIPMENT PROPOSED FOR CARRYING OUT THE WORKS

ITEM OF EQUIPMENT	DESCRIPTION, MAKE AND AGE (Years)	CONDITION (New, good, poor) and number available	OWNED, LEASED (From whom?), or to be purchased (From whom?)