Request for Bids
Small Works

Procurement of:

CONSTRUCTION OF CHIFUCHAMBEWA SOLAR POWERED WATER SUPPLY PROJECT AT GVH CHIFUCHAMBEWA IN T/A KHOMBEDZA SALIMA DISTRICT

RFB No: MW-SADC-LIFE-AR-CHIFUCHAMBEWA BOREHOLE-2024-25-RFQ
Project: LIFE-AR
Employer: Salima District Council
Country: Malawi
Issued on: 05/05/2025

5TH MAY, 2025

Procurement of: CONSTRUCTION OF CHIFUCHAMBEWA SOLAR POWERED WATER SUPPLY PROJECT AT GVH CHIFUCHAMBEWA IN T/A KHOMBEDZA SALIMA DISTRICT

Ref No: MW-SADC-LIFE-AR-CHIFUCHAMBEWA BOREHOLE-2024-25-RFQ

Project: CONSTRUCTION OF CHIFUCHAMBEWA SOLAR POWERED WATER SUPPLY PROJECT AT GVH CHIFUCHAMBEWA IN T/A KHOMBEDZA SALIMA DISTRICT

Employer: SALIMA DISTRICT COUNCIL

Country: MALAWI

Issued on: 5th May, 2025

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REQUEST FOR QUOTATIONS

RFQ Ref No.: MW-SADC-LIFE-AR-CHIFUCHAMBEWA BOREHOLE-2024-25-RFQ

RFQ Date: **5th May, 2025**

To: _____ ***[insert Contractor's name]***

Dear: ***[insert name of Contractor's representative]***

Request for Quotation (RFQ)

CONSTRUCTION OF CHIFUCHAMBEWA SOLAR POWERED WATER SUPPLY PROJECT AT GVH CHIFUCHAMBEWA IN T/A KHOMBEDZA SALIMA DISTRICT

The Government of Malawi has received financing from the LIFE-AR toward the cost of the **CONSTRUCTION OF CHIFUCHAMBEWA SOLAR POWERED WATER SUPPLY PROJECT AT GVH CHIFUCHAMBEWA IN T/A KHOMBEDZA SALIMA DISTRICT** and intends to apply part of the proceeds toward payments under the contract **CONSTRUCTION OF CHIFUCHAMBEWA SOLAR POWERED WATER SUPPLY PROJECT AT GVH CHIFUCHAMBEWA IN T/A KHOMBEDZA SALIMA DISTRICT; item 1.T**he Salima District Council now invites quotations from contractors for the Works described in Annex 1: Works Requirements, attached to this RFQ.

Fraud and Corruption

1. The LIFE-AR requires compliance with the Bank's Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework, as set forth in Appendix A to the Contract Conditions.
2. In further pursuance of this policy, Contractors shall permit and shall cause their agents (where declared or not), subcontractors, sub consultants, service providers, suppliers, and personnel, to permit the Bank to inspect all accounts, records and other documents relating to the RFQ and Contract performance (in the case of award), and to have them audited by auditors appointed by the LIFE-AR.

Eligible Materials, Equipment and Services

3. The materials, equipment and services to be supplied under the Contract and financed by the Bank may have their origin in any country subject to Para. 9. At the Employer's request, Contractors may be required to provide evidence of the origin of materials, equipment and services.

Eligible Contractors

4. In case the Contractor is a joint venture (JV), all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Request for Quotations process and, in the event the JV is awarded the Contract, during contract execution.
5. A Contractor may have the nationality of any country, subject to the restrictions pursuant to paras. 8 and 9 hereinafter. A Contractor shall be deemed to have the nationality of a country if the Contractor is constituted, incorporated or registered in, and operates in conformity with, the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or sub Consultants for any part of the Contract including Related Services.
6. Firms and individuals may be ineligible if so indicated in para.9 below and:
   (a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or the contracting of works or services required; or
   (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country, or any payments to any country, person, or entity in that country.
7. In reference to paras. 5 and 7, for the information of Contractors, at the present time firms, goods and services from the following countries are excluded from this procurement process:
   (a) Under para. 5 and 8 (a): *[insert a list of the countries following approval by the Bank to apply the* restriction *or state "none"].*
   (b) Under para. 5 and 8 (b): *[insert a list of the countries following approval by the Bank to apply the restriction or state "none"]*
8. A Contractor that has been sanctioned by the Bank, pursuant to the Bank's Anti-Corruption Guidelines, in accordance with its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework as described in the appendix to the Contract Conditions (Appendix A) paragraph 2.2 d., shall be ineligible to submit Quotations or be awarded or otherwise benefit from a Bank-financed contract, financially or otherwise,

during such period of time as the Bank shall have determined. A list of debarred firms and individuals is available on the Bank's external website: http://www.worldbank.org/debarr.

9. Contractors that are state-owned enterprises or institutions in the Employer's country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Bank, that they:

   (a) Are legally and financially autonomous;

   (b) Operate under commercial law; and

   (c) Are not under supervision of the Employer.

10. A Contractor shall not have a conflict of interest. Any Contractor found to have a conflict of interest shall be disqualified. A Contractor may be considered to have a conflict of interest for the purpose of this Request for Quotations process, if the Contractor:

   (a) directly or indirectly controls, is controlled by or is under common control with another Contractor that submitted a Quotation;

   (b) receives or has received any direct or indirect subsidy from another Contractor that submitted a Quotation;

   (c) has the same legal representative as another Contractor that submitted a Quotation;

   (d) has a relationship with another Contractor that submitted a Quotation, directly or through common third parties, that puts it in a position to influence the Quotation of another Contractor, or influence the decisions of the Employer regarding this Request for Quotations process; or

   (e) or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the Request for Quotations process; or

   (f) or any of its affiliates has been hired (or is proposed to be hired) by the Employer or Borrower for implementing the Contract; or

   (g) would be providing goods, works, or non-consulting services resulting from, or directly related to consulting services for the preparation or implementation of the project specified in this Request for Quotations, that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm; or

   (h) has a close business or family relationship with a professional staff of the Borrower (or of the project implementing agency, or of a recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the Request for Quotations or specifications and/or the

evaluation of Quotations, of the subject Contract; or (ii) would be involved in the implementation or supervision of such Contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Bank throughout the Request for Quotations process and execution of the Contract.

Performance Security

11. A **Performance Security is required.** The successful Contractor shall submit a Performance Security in accordance with the Contract Conditions.

Validity of Quotations

12. The quotations shall be valid until **120 days**

Price

13. The Contractor shall quote its total price in the Contractor's Quotation Form.

Contractors shall be awarded not more than two (2) Lots.

[Select either of the two options below]

[Option 1- Admeasurement contracts

14. *The Contractor shall also fill in its rates and prices for all items of the Works described in the attached Bill of Quantities. Items against which no rate or price is entered by the Contractor will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.*

    The rates and prices shall include all duties, taxes, and other levies payable by the Contractor under the Contract, as of the date 7 (seven) days prior to the deadline for submission of quotations

Option 2- Lump-Sum contracts

16. *The Contractor shall also fill in a breakdown of its lump-sum price in the attached Activity Schedules.*

    The quoted price shall include all duties, taxes, and other levies payable by the Contractor under the Contract, as of the date 7 (seven) days prior to the deadline for submission of quotations.]

17. A Contractor expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's Country and wishing to be paid accordingly, shall indicate a foreign currency of its choice in addition to the local currency in: **N/A**

18. The currency (ies) of the Quotation and the currency (ies) of payments shall be the same.

Technical proposal

19. The Contractor shall furnish a technical proposal including a statement of work methods, equipment, personnel, schedule and any other relevant information, in sufficient detail to demonstrate the adequacy of its proposal to meet the work's requirements and the completion time.

Clarifications

20. Any clarification request regarding this RFQ may be sent in writing to Procurement Officer (Esther Makonokaya) **0993 512 790** before **12th May, 2025** on or before **10:00 Hours**. The Employer will forward copies of its response to all Contractors including a description of the inquiry but without identifying its source.

Submission of Quotations

21. Quotations shall be submitted in the form attached at Annex 2 and in **Hard Copy (1 Original and 2 Copies) and in a Flash Disk (**word and or Excel**)**. ~~Quotations submitted as email attachments shall be in the form of scanned non- editable images~~.

22. The deadline for submission of Quotations is on or before **12th May,2025 10:00 Hours.**

23. The address for submission of Quotations is:

Attention: **The IPDC Chairperson, Salima District Council P/Bag 15, Salima**

E-mail address: **ekanjadza@gmail.com**

24. Quotations will be opened by the Employer's representatives immediately after the deadline for the submission of Quotations.

Evaluation of Quotations

25. The quotations will be evaluated to determine substantial responsiveness of the technical proposal.

26. For evaluation and comparison purposes, the currency (ies) of the Quotations shall be converted into a single currency. The currency that shall be used for comparison purposes to convert at the selling exchange rate offered prices expressed in various currencies into a single currency is*: [Insert name of currency*]. The source of exchange rate shall be: [*Insert name of the source of exchange rates]*. The date for the exchange rate shall be*: [insert day, month and year]*.

27. For technically compliant quotations, the total evaluated prices, excluding provisional sums and any provision for contingencies but including day works where priced competitively, will be compared to determine the lowest evaluated price/s.

***[Insert the following if there are multiple lots*:** "Quotations will be evaluated lot-wise, taking into account discounts offered, if any, after considering all possible combination of lots".

Contract Award

[Select either of the two options below]

[Option 1- For Single Lot

28. The Contract will be awarded to the Contractor who meets the eligibility requirements in accordance with the RFQ, offers the lowest evaluated price/s, offers a technically compliant quotation, and guarantees completion of the Works by the specified date.

***[Option 2- For Multiple Lots* (*Not* to be applied)**

28. ~~The contracts will be awarded to the Contractor or Contractors meeting the eligibility requirements in accordance with the RFQ, offering a technically compliant quotation, guaranteeing completion of the Works by the specified date and offering the lowest evaluated price to the Employer for combined lots."~~] **Not to be applied**

29. The Employer shall invite by the quickest means *[e.g. e-mail]* the successful Contractor/s for any discussion *[this is expected to be virtual in light of the emergency situation]* that may be needed to conclude the contract or otherwise for contract signature.

30. The Employer shall communicate by the quickest means with the other Contractors on its contract award decision. An unsuccessful Contractor may request clarifications as to why its quotation was not determined to be successful. The Employer will address this request within a reasonable time.

31. The Employer shall publish a contract award notice on its website with free access, if available, or in a newspaper of national circulation or UNDB online, within 15 (fifteen) days after award of contract. The information shall include the name of the successful Contractor, the Contract Price, the Contract duration, summary of its scope and the names of the Contractors and their quoted and evaluated prices.

On behalf of the Employer:

Signature:

Name: Esther Makonokaya

Title/position: DISTRICT PROCUREMENT AND DISPOSAL OFFICER

Attachments:

Annex 1: Works Requirements
Annex 2: Quotation Form
Annex 3: Contract Forms

ANNEX 1: Works Requirements

Specifications

[Include specifications for the Works, and include, as applicable, any environmental and social requirements including the Code of Conduct, minimum qualifications of key staff that may be required,

CONSTRUCTION OF CHIFUCHAMBEWA SOLAR POWERED WATER SUPPLY PROJECT AT GVH CHIFUCHAMBEWA IN T/A KHOMBEDZA SALIMA DISTRICT

SECTION A: QUOTATION REQUIREMENTS

1) **Description:**
2) Works are to commence by **7 *days*** from the dated of possession of site.
3) Works to be completed by: **120 *days*** from the date of order.
4) Quotations must be valid for **90 days** from the date for receipt given below.
5) Quotations and supporting documents as specified in Section B must be clearly marked with the Procurement Number given above and must indicate acceptance of the stated terms and conditions.
6) Quotations must be received, in sealed envelopes no later than : 10 hours on 12th April 2025.
7) Quotations must be returned to:

   Procurement and Disposal Unit, Private Bag 15, Salima.
8) The attached Activity Schedule (for lump sum contracts) or Schedule of Rates and Prices (for contracts where payment is based on unit prices) *{delete as appropriate}* at Section C details the works to be performed. You are requested to quote by completing Sections B and C. Quotations shall cover all costs of labour, materials, equipment, overheads, profits and all associated costs for performing the works including all taxes and duties. The whole cost of performing the works shall be included in the items stated and the cost of any incidental works shall be deemed to be included in the prices quoted.
9) The Bidder shall submit its Code of Conduct that will apply to its employees and subcontractors, to ensure compliance with its Environmental, Social, Health and Safety (ESHS) obligations under the contract.
10) Quotations that are responsive, qualified and technically compliant will be ranked according to price. Award of contract will be made to the lowest priced quotation by the issue of a Local Purchase Order

Signed: ……Date: …..……..……..

Name: ESTHER MAKONOKAYA

Title/Position: **District Procurement Officer,** for and on behalf of the Procuring Entity

Your quotation is to be returned on this Form by completing and returning Sections B and C including any other information and certification as stated within this RFQ.

SECTION B: QUOTATION SUBMISSION SHEET

1) Currency of Quotation: Malawi Kwacha

2) Works will commence within …….days/weeks/months from date of Purchase Order.

3) Works will be completed by ……days/weeks/months from date of Purchase Order

4) Validity period of this quotation is ……..days from the date for receipt of Quotations.

5) We attach the following documents:

(i) Section C of the Request for Quotations completed and signed;
(ii) A copy of business registration Certificate
(iii) A copy of our Trading Licence and NCIC 50 million category
(iv) A copy of our Annual Tax Clearance Certificate (for last financial year)
(v) A copy of PPDA Certificate
(vi) Valid National water resources Authority (NWRA) Certificate
(vii) Relevant experience in construction of high yielding boreholes with evidence of successful works in past two years
(viii) Evidence of ownership of basic equipment i.e Drilling Rig, Compressor, support trucks, geneset, Submersible pump, welding machines, survey machines.
(ix) Program of works schedule
(x) Normal Working Hours
(xi) List of Basic Labour Rates
(xii) List of Basic Plant Hire Rates
(xiii) The Analysis of Major Unit Rates
(xiv) Bid Securing Declaration
(xv) Evidence of Liquid Assets
(xvi) Management Strategies and Implementation Plans (MSIP) to manage the following key Environmental, Social, Health and Safety (ESHS) risks.

- *Water Resource Protection Plan to prevent contamination of drinking water*.
- *Boundary marking and Protection Strategy for mobilization and construction to prevent offsite adverse impacts*.
- *Gender based violence and sexual exploitation and abuse (GBV/SEA) prevention and response action plan.*

6) We confirm that our quotation is subject to the terms and conditions stated in your Request for Quotations referenced above, and that any resulting contract will be subject to the Government of Malawi General Conditions of Contract for Local Purchase Orders.

7) We confirm that the prices quoted are fixed and firm for the duration of the validity period and will not be subject to revision or variation.

Quotation Authorisation:

Signed: …… ……Date: …..…….

Name: …… Title/Position: ……

Authorised for and on behalf of (Company name and seal): ……

……..……

……..

……

….

If any additional documentation is attached to your quotation, a signature and authorisation at Section B and Section C is still required as confirmation that the terms and conditions of this RFQ prevail over any attachments. If the Quotation is not authorised in Section B and Section C, the quotation may be rejected.

EVALUATION AND QUALIFICATION

Qualification Criteria

(a) Average Annual Volume (**AAV**) of construction work over the past **Three (3) financial years (2021/2022, 2022/2023, 2023/2024)** of at least **fifty Million Malawi Kwacha** (**MK50, 000, 000.00). Attach Completion certificates** and their corresponding **payment Vouchers.**

(b) **Experience** as **prime contractor** in related Works of at least **Three (3)** works of a similar nature and complexity equivalent to the Works over the last **Three (3) financial years (2021/2022, 2022/2023, 2023/2024)**

Evidence required: 1. **Works** cited on (**b**) should be **One Hundred percent (100%)** complete. 2. **Three (3) Completion certificate** of the works cited on (**b**) and their corresponding **payment Vouchers.**

(c) Proposals for the timely acquisition (own, lease, hire, etc.) of the following **essential equipment**:

i. *Geophysical Equipment*

ii. *Compressor and accessories*

iii. *Drilling Rig and accessories*

iv. *Mud pump and accessories*

v. *Casing*

vi. *Dip meter*

vii. *Pump Testing Equipment*

viii. *10 Tonner Truck*

(d) **Key personnel** with the following qualifications and experience:

No. Required	Position	Qualification	Total General Experience (no. of years)	Specific Similar Experience relevant to the Position (Number of Projects * see below)
1	Project Manager	BSc. In Civil Engineering, Geophysical Engineering or Earth Science	5 years	5 years
2	Supervisor	Diploma in Geophysical Engineering or City and Guilds	5years	5 years
3	Rig Operator	MSCE	5 years	5 years
4	Mechanic	City and Guilds in Mechanics	5 years	5 years

(e) Liquid assets and/or credit facilities, net of other contractual commitments and exclusive of any advance payments which may be made under then contract, of no less than **MK 15,000,000.00 (Fifteen Million Kwacha). Original letter from Bank has to state the actual amount of credit facility available and has to be dated 8th April, 2025 or later.**

A consistent history of litigation or arbitration awards against the applicant or any partner of a Joint Venture may result in disqualification.

The figures for each of the partners of a Joint Venture shall be added together to determine the Bidder's compliance with the minimum qualifying criteria in (a) and (e) above; however, for a Joint Venture to qualify, each of its partners must meet must meet at least twenty-five (25) percent of the minimum criteria (a), (b) and (e) above for an individual Bidder, and the partner in charge at least forty (40) percent of those minimum criteria. Failure to comply with this requirement will result in rejection of the Joint Venture's Bid.

Subcontractors' experience and resources will not be taken into account in determining the Bidder's compliance with the qualifying criteria.

A. Scope of Works

The works shall include Construction of:

- Drilling of a boreholes equipped with An Afridev hand pump for the surrounding community including geo-physical investigations and siting, installation of casing and screens, well development, pump testing and construction of aprons.
- Water Quality testing. The contractor shall be required to carry out quality tests on the water samples for a newly constructed borehole in order to express the suitability of water to sustain uses or processes. The report of water quality testing together with final report of borehole drilling/rehabilitation shall be submitted to Salima District Council not later than weeks after completion of the Borehole construction work.
- A sample of water from the borehole shall be taken at the end of the constant rate test for Physical, Chemical and Bacteriological analyses. The physical and chemical analysis would determine the following: pH, temperature, colour, and turbidity, total dissolved solids (TDS), Calcium, Magnesium, Sodium, Potassium, Total Iron, Manganese, Bicarbonate, Sulphate, Chloride, Nitrate, Nitrite, Fluoride, and Total Hardness.
- Take note that Heart to Heart Foundation will **not pay** for any borehole whose water quality testing results will turn out positive (contaminated). It will be the responsibility of Contractor to check sources of contamination before starting drilling.
- Final Construction Report Submission. The Contractor shall be required to submit Borehole Construction Report (BCR) 10 working days (2 weeks) after completion of the construction work. Modifications may occur after review of the report, and the **Final Report** refers to the report that has undergone final modification. **Final payment** shall be made upon approval of the final report by Project Manager of Heart to Heart Foundation.

B. Technical Specifications

SECTION 1 GENERAL CONTRACT SPECIFICATION

1.1 General

Any clauses in this specification, which relates to work or materials not required by the Bills of Quantities or subsequently by a variation or extra works order shall be deemed not to apply.

The SI system shall be the official system of units.

It should be noted, however, that in the event of any dispute arising over a Metric Equivalent, it must be recalculated exactly in accordance with British Standard 350; Conversion Factors.

In this Specification, whenever a B.S. Specification is quoted, the contractor shall refer to the latest edition.

1.2 Scope and Applications

These Specifications shall apply to well siting using geophysical investigation methods, drilling, supply and installation of casing, well development, pump testing, capping, construction of civil works such as aprons, drainage, soak away and washing slabs, hand pump supply and installation, water quality analysis etc. The Works are to be investigated and constructed in accordance with but not limited to the details and descriptions in the Specification, Bills of Quantities, Contract Drawings and other Contract Documents or any variations or additions thereto which may be issued under the Terms of Contract.

1.3 Approval of Suppliers, Services, Materials and Goods

All materials to be provided shall be new, unused, of the most recent manufacture and incorporate all recent improvements in the design and material unless provided otherwise in the Contract.

Before entering into any sub-contract for the supply of any material or goods the contractor shall obtain the Project Manager’s approval, in writing, of the sub-contractor or supplier from whom he proposes to obtain such materials or goods. Should the Contract Manager at any time be dissatisfied with such materials or goods or with the method or

performance of such sub-contractor's work or place of business, the Contract Manager shall be empowered to cancel his previously given approval of such sub-contractor. The Contractor shall then obtain the said services, materials or goods from such other sub-contractor or supplier as may be approved by the Contract Manager and shall bear any additional cost therefore.

If during the Contract, through any reason, a supplier should increase the cost of materials above that of other equally reputable suppliers, the Contract Manager may only authorize payment for materials at the rates of other suppliers.

1.4 Contract's Orders for Materials

Without prejudice to any other clause in the Specification, the Contractor shall, before ordering any borehole construction, refurbishment and/or testing materials, or other articles for use and installation in the Works, seek the approval of the Contract Manager of the names of the persons or firms from whom he desires to obtain any such articles.

1.5 Sample

In addition to any special provisions herein from sampling and testing of materials, the Contractor shall submit to the Contract Manager as he may require samples of all materials and goods he proposes to use or employ in or for the Works. Such samples, if approved, will be retained by the Contract Manager and no materials or goods of which samples have been submitted shall be used on the permanent works unless and until such samples have been approved in writing by the Project Manager. Notwithstanding the Project Manager’s approval as provided for herein, the Contractor shall be solely responsible for the quantity of all materials and goods supplied unless specified otherwise.
The cost of supplying all such samples and of conveying the same to such place of inspection or testing as the Contract Manager may designate within the country of origin and/or the Employer's country and of complying with the requirements of this Clause shall be deemed to be included in the Bid rates and prices.

1.6 Test Certificates

Should the Contract Manager not inspect any materials or goods at the place of manufacture, the Contractor shall obtain certificates of tests performed on such materials or goods by an agency approved by the Contract Manager and shall certify that the materials or goods concerned have been tested in accordance with the requirements of the Specification and shall give the results of all the tests carried out. The Contractor shall provide adequate means of identifying the materials and goods delivered to the site with the corresponding certificates.

1.7 Contractor's Work Programme

A programme for the performance of the works as a whole and showing the proposed construction of particular undertakings shall be submitted by the Bidders with his Bid.

Pursuant to Clause 7 of the Conditions of Contract, the Contractor shall, within **7** days of the Commencement Date submit the revised work programme, showing in detail the order in which the various parts of the Works are to be implemented, with dates of commencement and completion and where necessary, intermediate stages of works and the dates thereof.

The programme shall, where required by the Contract Manager be accompanied by sketches showing in details the different stages of the programme. The said programme shall take into account the seasonal rainfall and flow of surface water.

After approval by the Contract Manager the revised Work programme shall be binding on the Contractor. Changes in the programme may be done by the Contractor only after prior approval to them has been obtained from the Contract Manager - , which shall not be unreasonably withheld.

The programme shall fully take into account and allow, in a methodical manner, for the need to coordinate procedures with other contracts being carried out in the area and the community in each drilling site.

The Contract Manger– shall be entitled at any time to demand changes in the work programme as he deems necessary for the proper and expedient performance of the works.

1.8 Drawings

1.8.1 General

The whole of the Works shall agree in all particulars with the details shown in the Drawings and Project Manager's instruction.

The Contractor shall carefully check the drawings supplied to him and shall bring any errors or discrepancies discovered therein to the attention of the Contract Manager who will issue the necessary instructions for corrections.

1.8.2 Additional Construction Drawings

The Contract Manager may at any time during the Contract period issue such additional construction drawings as may deem necessary for proper performance of the Works.

1.8.3 Records and As-Built Drawings

After the work has been completed, and prior to obtaining the Certificate of Completion, the Contractor shall furnish "As Built" drawings prepared during construction, showing the Works as constructed, together with all other information that may either be required or be useful in the future.

1.9 Rates and Prices

The rates and prices inserted by the Contractor are to be the full and inclusive value of the work described. They are to cover all costs, expenses and general risks which may be involved together with all liabilities and obligations set forth or implied in the specification and other documents on which the tender is based. They must include all general works of preparation, all plant, tools, materials sheds, offices, overhead charges and profit, transportation of materials and men, labour etc. necessary for carrying out the work. They must also take into account conditions referred to in General Conditions, proper and sufficient protection to works, necessary lighting, watching, fencing, safety of persons and property, the provision of temporary works, setting out, testing and all other matters requisite for the satisfactory completion and commission of works, the provision of all design work, specification, etc. to the approval of the Contract Manager as required by these documents.

1.10 Survey

LEVELS

It shall be the responsibility of the contractor before commencing work to obtain from the Contract Manager in writing the value and the location of the bench mark(s), where applicable, to be used in these works and any additional bench mark(s) required shall be established in relation to those given before work is carried out. These benchmarks shall be constructed and protected to the approval of the Contract Manager and shall be checked periodically.

Any checking or approval by the Contract Manager of the bench marks plans or schedules will not relieve the Contractor of his responsibilities under the Contract.

After the area of any section of the Works has been cleared, but before any other earthwork is commenced, surface levels of the ground shall be taken by the Contractor. Levels shall similarly be taken on the surface of sound ground exposed after the removal of unsuitable overburden prior to placing filling for embankments, etc.

All levels thus obtained are to be put on the applicable Contract Drawings and, where necessary, new drawings showing the surface levels shall be prepared.
Before any further earthwork commences the revised or new drawings shall be signed by the Contract Manger and the Contractor. These signed drawings will be used when measuring the final quantities of excavation or fill.

(B) SURVEY BEACONS

During the progress of the works, the Contractor shall not remove, damage, alter or destroy in any way whatsoever, any plot or survey beacons.

(C) SETTING OUT OF WORKS

The Contractor shall be responsible for the correct setting out of all parts of the Works included in the Contract, including where necessary, calculation of setting out data.

At least seven days prior to any survey work the Contractor shall inform the Contract Manager of his intention to commence these works. This information is required to permit the Contract Manager to coordinate survey works with other on-going works, including those of third parties.

If the position of Works has been given in the drawings in relation to points which in their turn require setting out, e.g. plot boundary marks which have been demolished or otherwise removed, all such additional setting out shall also be made by the Contractor at no extra charge.

For such parts of the Works where no setting out details are given in the drawings, the Contract Manager will supply setting out data or show the exact location on site during the course of the Contract.

NOTE!!
PRE-SITE VISIT
Site visit to the project sites is a MUST on 8th May 2025. Bidders who do not appear on the site visit register as verified by Salima Water and Sanitation Office will be disqualified

1.11 Discharge of Water from Works

The Contractor shall make such provisions for the discharge of any water, whether fouled or discoloured or otherwise, from the Works as shall be satisfactory to the Contract Manger and to any authority and/or person having rights over the lands or watercourses over or down which such water is discharged. The Contractor shall hold the Employer indemnified against any claim that may be made through non-compliance with this Clause.

In the event of there being any interference with existing land or road drainage due to the construction of the Works within or without the limits of the works, the Contractor shall take immediate steps to restore the drainage to the satisfaction of the Contract Manager– and owners, occupiers, or the authority concerned.

1.12 Access to Site

The Contractor shall make his own arrangements for access to the various parts of the Sites but all such accesses shall be subject to the approval of the Contract Manager and shall be maintained by the Contractor throughout the construction period at no extra cost.

1.13 Contractor's Office and Temporary Buildings

The Contractor shall make his own arrangements, at his own, expenses for all local accommodation he may require for offices, yards, stores, labour camps etc. and all buildings and all services in connection therewith as required for the efficient execution of the Works. The Contractor shall pay proper regard to the prevention of obstruction and the avoidance of nuisance to the public and to residents. Offices etc. shall be located to the satisfaction of the Contract Manager.

1.14 Relations with Local Authorities and Residents

The Contractor shall liaise with the Local Government Authorities on matters concerning the impact of his operations on the local communities. The District Coordinating Teams (DCTs) in the work area will perform a central role in supervision and ensuring quality of works. They will also certify completion of works and submit signed reports to the Employer. The Contractor is expected to work in close collaboration with the said Local Government Authority and community representatives. Any problems which cannot be resolved by the Contractor should be referred to the Employer through the Contract Manager

Public Relations

The Contractor shall not publish or provide any information relating to progress or financial status of the Works to any person or organization without the prior consent of the Contract Manager

1.15 Roads

The access roads and all other roads and tracks outside the Contractor's fenced site establishment areas shall be deemed to be public highways

for all purposes related to the road and traffic law, public and third party liability, insurance and related considerations.

1.16 Property outside the Site

The Contractor shall not enter private or Government land outside the site without written approval from the Contract Managerr and the owner and /or occupier of the land

The Contractor shall take all practicable measures in coordination with appropriate authorities or private owners of the land in the immediate vicinity of the Contractor's working sites or site establishment areas to ensure that no member of his work force erects or situates any temporary accommodation, shelter, trading stall, or other type of settlement or establishment on this land unless such person or persons have obtained written permission from appropriate authorities or private owners of the land for the erection or situation of such settlement or establishment.

1.17 Compensation

There will be no compensation payable to anyone under this project.

Construction of the Works in particular area shall not commence until the beneficiary community provides consent for the use of the land.

1.18 Graves and Tombs

Access will not be permitted to any areas within the site which contain graves and /or tombs unless written authorization to enter such areas has been obtained from the District Commissioner. A copy of each letter of authorization shall be submitted to the Contract Managerr before the area is entered

Separate payment will not be made for complying with the requirements of this Clause and all costs shall be deemed to be included in the rates in the Bill of Quantities.

1.19 Site to Be Kept Clean

The Contractor shall, at his own cost, keep the site free from rubbish and take such other precautions that may be necessary in the opinion of the Contract Manager or the Health Officer to prevent the breeding of pests or the risk of diseases, etc.

1.20 Water Supply

Water will be required for the purpose of construction of the works. The Contractor shall make his own arrangements for obtaining supplies of water of approved quality, and shall erect and maintain all required pumps, pipes, cocks, tanks, mobile tanks, hoses and other appliances required to distribute the water as necessary to the various parts of the Works.

If necessary, the Contractor will make arrangements to pump water from rivers and other sources, and provide temporary treatment facilities. The Contractor shall provide at all times and at his own expense, for his own labour a supply of potable water in proper hygienic conditions.

The cost of supplying water for all purposes shall be uniformly spread over all items of the Bills of Quantities. The cost of supplying water shall in each instance include the cost of water at the source of supply and its distribution and conveyance to where it is used, including connecting up, lying of pipes, metering, pumping, use of tankers and the like.

The Contractor shall not assume that water will be available for his use from the public mains at the times and in the quantities required by him.

Where permitted to connect up to existing mains and pipelines for the purpose of obtaining water, the Contractor shall comply with all regulations and requirements of the competent authority. The Contractor shall himself obtain all related permits and make all arrangements as may be required for the performance of the connection.

The Contractor shall be solely responsible for the supply of all water required in the works for whatever purpose and no claim for extra payment or extension of time based on the lack or insufficient or delayed supply of water will be considered or entertained.

1.21 Electric Power Supply

The Contractor shall make his own arrangements for all electric power supply which will be needed for the execution of the Works.

The Contractor shall provide, erect, operate and maintain in good condition a diesel driven electric generator, large enough to supply the contractual requirements. Sufficient stand by is essential to ensure the required electric power at all times.

The Contractor shall also install, connect and maintain in good condition all cables, conductors and other electrical plant and equipment required to perform his contractual obligations. All such plant and installations as described above shall comply with the relevant requirements and regulations of ESCOM. All the electrical facilities shall be erected and be maintained to the full satisfaction of the Project Manager.

The cost of providing electric power supply for all purposes shall be uniformly spread over all items of the Bill of Quantities.

1.22 Storage of Goods and Materials

The Contractor shall store all materials on site in a neat and orderly fashion and in such a manner which, in the opinion of the Contract Manager will minimize the risk of damage or theft.

The Contractor shall select and arrange at his own expense, for any temporary occupation of land outside the site which he requires for the efficient execution of the works. The Contractor must comply fully with all By Laws and Regulations currently in force in the area.

1.23 Contractor's Plant and Method of Working

All plant and equipment used by the Contractor in the execution of the works, shall be of such types and sizes, and shall be used in such manners as approved by the Project Manager.

The Contractor shall only adopt methods of working approved by the Contract Manager but any approval that may be given will not relieve the Contractor of his responsibility for the proper execution and safety of the Works.

If circumstances arise which, in the opinion of the Contract Manager necessitate a change in the method of working, or the suspension of the

use of any part of the plant or equipment, either temporarily or permanently, and notwithstanding the previous approval of the Contract Manager of the method of working, or of the type, size and manner of using such plant or equipment, either on the portion of the works effected, or on any other portion of the Works, the Contractor shall immediately adopt another approved method of working, or other approved plant, and shall have no claim against the Employer for costs incurred by him in changing the method of working, the suspension of use of any part of the Plant, or in the provision and use of such other Plant.

1.24 Variation in Method of Construction

Where a method of construction for a particular section of the Works is detailed or specified in the Contract Documents, or is reasonably to be inferred therefrom, the Contractor shall at all times observe such method of construction, unless he shall have previously obtained the approval of theContract Manager to an alternative method of construction. Unless the Contract Manger should, at the time of giving approval to a variation in the method of construction at the same time give approval to a variation in the cost of carrying out such Work, such Work shall be paid for as though it had been executed by the method of construction detailed, specified in, or reasonably to have been inferred from the Contract Documents.

1.25 Temporary Works

The Contractor shall make such provision in the nature of temporary works as may be required for the purpose of ensuring the safety of the Works and adjoining property, and for the protection of persons and animals. The Contractor shall also make provision, where applicable, for the erection of all constructional plant, all works for temporary diversion of drainage channels and other services, pumping, extra excavation, timbering and shoring, storing materials.

Details of temporary works shall be submitted in advance to the Contract Manager for his approval and the approval shall not relieve the contractor of complete responsibility for their safety and satisfactory operation.

1.26 Adjoining Properties and Buildings, Traffic Flow and Diversions

The Contractor shall so carry out all his operations as not to encroach on or interfere with, trespass on or injure adjoining land, properties, roads, structures, places and things in the vicinity of the Works.

All buildings erected by the Contractor, camp site or sites and the layout of the buildings and sites shall comply with the laws of Malawi, Local Bye Laws and Building Regulations.

The Contractor shall maintain a clean, safe and adequate passageway for pedestrians along highways, footways and tracks and to each adjoining property and is reminded that he has a special duty to persons with disabilities. Unless he has obtained the written consent of the appropriate authority to close the road, he shall also maintain a satisfactory passageway for vehicular traffic. He shall at his own expense provide and operate such methods of traffic control as are required by the Contract Manager or the competent authority.

The Contractor is responsible for ensuring that traffic is not held up during the execution of the Works and should he consider that a road closure or diversion is necessary he shall be responsible for obtaining permission from the appropriate authority and for making all necessary arrangements and meeting all costs arising from such road closure or diversion.

1.27 Temporary Traffic Signs, Direction Signs and Boards

The Contractor shall erect and maintain on the works and at prescribed points on the approaches to the works, all traffic signs necessary for warning, direction for visitors and control of traffic and the size of all such signs and the lettering and wording thereon shall be approved by the Contract Manager before erection. The sign should be reflector or adequately illuminated at night by approved means.

1.28 Materials on and Under the Site

All soil, turf, gravel, stones, timber, pipes, cables, equipment or other materials obtained in the excavations, clearing of site and soil stripping, or other work shall belong to the Employer and must not be removed from site without the consent of the Project Manager. The Contractor, however, may use for the construction of the works, any of the materials excavated under the Contract which the Contract Manager– may determine to be fit for such use, and shall use such materials if directed

by the Contract Manger. The cost for disposal of all material not used in the works shall be included in the Contractor's rates.

1.29 Restoration of Works Site

Upon completion of the works, or any portion thereof, the ground, fences and any structures that have been interfered with are to be carefully restored to their original condition. All surplus spoil resulting from the excavations, rubbish, tools, tackle, plant and material must be removed immediately from each portion of the Work as soon as it is completed. Each completed section of the work is to be left in a neat and tidy condition.

1.30 Safety Precaution on the Works

Work is to be executed in a safe and responsible manner and construction is to proceed in accordance with the provision of appropriate legislation.

The attention of the Contractor is drawn to regulations and Laws in force. The Contractor is fully, and in all respects, responsible for the safety on the Works.

1.31 Contractors Staff

The Contractor engaged upon the execution of the Works shall be deemed to employ, or to procure the employment of, staff skilled and experienced in works of a similar nature to the Works.

1.32 Quality of Materials and Workmanship

Unless specified otherwise or approved by the Programme Coordinator all materials and workmanship shall comply with the latest issue of the appropriate Malawi Bureau of Standards (MBS), SABS or British Standard Specification or Code of Practice including all current amendments. Materials not covered by a British Standard Specification shall be the best of their respective kinds, unless materials of inferior quality are particularly specified by the Contract Manager and shall always be subject to the Contract Manager’s approval.

The Contractor shall supply at his own expense, any evidence the Contract Manger may require of the compliance of this Clause and when

satisfactory evidence is not forthcoming, the Contractor will be required to supply samples and arrange for testing of such samples in a manner to be determined by the Contract Manager. The cost of all samples and testing shall be borne by the Contractor.

Any materials which, in the opinion of the Contract Manger are unsatisfactory shall not be used on the Site and alternative materials shall be supplied at the Contractor's expense.

1.33 Protection and Repair of Construction

All works shall be protected and should the Contractor fail to adequately protect any parts of the works and they become heaved, cracked or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor at his own expense.

1.34 First Aid Facilities

The Contractor shall provide and maintain in easily accessible positions at the site of the works adequate equipment and first aid facilities for the duration of the contract, all in accordance with the Laws of Malawi.

The Contractor shall allow in his rates and prices and shall be responsible for the cost of all welfare, first aid and health requirements. The Contractor shall ensure that first aid kits are readily available at all points where work is being carried out.

1.35 Inspections by Programme Coordinator during Period of Maintenance

The Contract Manager – will give the Contractor due notice of his intention to carry out any inspections during the Period of Maintenance and the Contractor shall thereupon arrange for a responsible Representative to be present at the time and dates named by the Contract Manger. The Representative shall render all necessary assistant and take note of all matters and things to which his attention is directed by the Contract Manager.

1.36 Advertisements

No advertisements shall be placed on any boarding, fencing or scaffolding erected for any purpose connected with the Contract without the written permission of the Project Manager.

1.37 Use of Parts of the Works on Their Completion

Should the Employer so desire he shall have full power to use and put into active operation any or all sections or parts of the Works directly when they are finished. Such action shall not however relieve the Contractor of his obligations with regard to maintenance nor shall he be entitled to any extra payment on account of any loss of time or inconvenience he may suffer as a result of such action by the Employer.

1.38 Fire Precautions

The Contractor shall provide at the site adequate audible means of giving the alarm in the event of an outbreak of fire and shall make all arrangements which may be necessary for the sounding of such an alarm. The Contractor shall take all precautions against fire and he shall provide firefighting appliances, labour, machetes, beaters, axes, as may be necessary for the isolation and extinguishing of fires with the utmost expedition.

1.39 Site Diary and Report

During the course of the Contract the Contractor shall furnish two copies of each of the following contract records to the Contract Manager for his review and approval:

- Monthly progress reports of work in an agreed format, and the report shall be issued before the 7th day of each month and shall give details of progress with the Contract during the preceding month, including order, stocks of materials, delivery, etc;

- Groundwater investigation report for borehole siting at each village including the VES curves and their interpretations for each drilling site;

- Day to day diary sheet recording plant, materials delivered to site, employed manpower and work executed, weather condition, visitors; and

- Other items as specified or required by the Project Manager.

1.40 Progress Meetings

The Contractor shall be required to attend regular Site Progress Meetings with the Contract Manager where the progress of construction will be reviewed. Such meetings shall normally be held monthly or as may be required and may be attended by representatives of the Employer. The Contractor shall present a report on progress to the Contract Manager before the meeting at a time to be agreed for circulation to participants by the Contract Manager.

The progress meeting agenda will include approval of previous minutes, a report on progress of construction in relation to the construction programme and matters arising from any difficulties encountered in the construction of the Works.

When the minutes of the meeting prepared by the Contract Manager have been accepted by the other participants, the minutes will be deemed to be a true record of the declaration, instructions and decisions taken during the meetings.

When the Contractor requested by the Contract Manager will be required to attend other meeting from time to time on special subjects.

1.41 Construction Methods

1.41.1 General

Unless otherwise confirmed in writing, acceptance of the Tender will not signify acceptance of the Contractor's proposed methods of construction or materials, nor will it in any way relieve the Contractor of any of his responsibilities for the Works. Further it will not be accepted as a basis for claiming additional compensation where the proposed methods of construction, its end results, or the proposed materials do not comply with the Specification not approved.

1.41.2 Submissions to the Programme Coordinator

Wherever the Specification requires that the Contractor shall make a submission to the Contract Manager the Contract Manager will consider such submission and reply to the Contractor in accordance with the relevant provision of the Conditions of Contract. Unless a defined period of time is stated in the Specification, each submission

shall be made by dates to be agreed with the Contract Manager. The Contract Manager will either approve or comment on submission from the Contractor expeditiously but no later than 7 days after receipt except where otherwise stated in the Contract. Where, in the opinion of the Contract Manager substantial checking or calculation work would be required before the Contract Manager would be able to approve or comment on the Contract's submission, the Contractor shall not unreasonably withhold his agreement to a longer period of time as requested by the Contract Manager.

Documents submitted other than drawings and manufacture's literature, shall be A4 in size. All documents shall be in English and any abbreviations shall be explained. All calculations and technical information shall be in units conforming to the System International d'Unites (SI).

All drawings shall be A3 paper size. Notes shall be in English. All drawings shall have the appropriate scales drawn on them. All dimensions shall be in meters or millimetre and all weights in metric tonne or kilograms.

All drawings shall include the title of the Contract at the bottom of the drawing followed by the title of the drawings concerned.

1.41.3 Correspondence with the Programme Coordinator

All correspondences shall be numbered and distributed in accordance with an agreed procedure.

1.42 Units of Measurement

(1) Unless specifically stated to the contrary, the units of measurement to be used throughout the Contract shall be based on the S.I. system.

(2) Abbreviations, whether singular or plural, shall be as follows:

Kilometre	km	Metre	m
Millimetre	mm	Hectare	ha
Square metre	m^2	Cubic metre	m^3
Litre	l	Millilitre	ml
Tonne	t	Kilogramme	kg
Gramme	g		

SECTION 2 CLEARING SITE AND EARTHWORK

2.1 Site Clearance

Site clearance shall be carried out only over the minimum area required by the Contractor to carry out the works and the extent of all clearing, whether to be paid for under items in the bill of quantities or not, shall be agreed with the Contract Manager or his representative before the work is commenced.

The Contractor shall give written notice to the Contract Manager or his representative at least seven days in advance, of his intention to commence site clearance to enable arrangement to be reached, and for the Contract Manager or his representative to ensure that arrangements to compensate plot owners are completed. Work shall commence only with the written authority of the Contract Manager or his representative.

The Contractor shall remove buildings, walls, gates, fences advertisements and other structures and obstructions, grub up and remove trees, hedges, bushes and shrubs and clear to the size of the works at such time and to the extent required by the contract and as directed by the Contract Manager or his representative. The materials so obtained shall so far as suitable be reserved and stacked for further use. All rubbish and material unsuitable for use shall be destroyed or removed from the site.

In areas of bulk excavation where top soil has to be excavated this shall be removed and stacked on site. After completion of construction, it shall be spread over the disturbed ground; any surplus being disposed of as directed by the Contract Manager or his representative.

No allowance will be made for cutting and removal of bushes, crops, grass, weeds and similar vegetation. The cost of all such works will be held to be included in rates entered in the Bills of Quantities for site clearance.

The Contractor shall take all necessary precautions against the growth on site of weeds and remove them as necessary throughout the period of works and maintenance.

2.2 Disposal of Surplus Material

The Contractor shall not, during the construction of the works, allow any accumulation of surplus earth, rock, clay or other material removed from the excavations and not required for refilling. As trenches are refilled or work is completed the surplus material from excavations, bricks and other rubbish or waste matter shall at once be removed, the surface properly restored and sites, roadways and foot ways left clear.

In general and if approved of by the Contract Manager or his representative surplus soil, but not rubbish or rock, from excavations shall, without extra cost, be spread evenly over areas adjacent to such excavations to form a layer not exceeding 100mm thick, provided always that such spreading does not interfere with other work under this Contract, the work of other Contractors, with the natural flow of storm water, or with the cultivation or other use of the land.

On no account shall the Contractor start making dumps of surplus materials except at places approved by the Contract Manager or his representative.

2.3 Measurement and Payment for Earthworks

The tendered prices for earthworks shall include for all associated work such as setting out in plan and in level, side sloping, timbering, shoring strutting, storm water protection, dewatering, draining, trimming to line and level or grade, removing tree roots and obstructions as specified disposal of soil and surplus material, testing to confirm compliance with the specification and all other contingent works not billed specifically.

All excavations shall be measured net to the lines and levels specified on the drawings or otherwise by the Contract Manager or his representative. The depth of excavation shall be taken as the depth from the actual cleared ground level to the formation level specified by the Contract Manager or his representative.

2.4 Surface Restoration

On completion of the works, or section of the works, or where dry borehole is abandoned, the Contractor shall restore all disturbed surfaces to their original condition. All such work shall be carried out to the satisfaction of the Contract Manager or his representative.

SECTION 3 CONCRETE WORKS

3.1 Cement

Unless otherwise specified the cement used in the Works shall be Ordinary Portland Cement (OPC) complying with BS 12 at the time of use.

3.2 Aggregates General

Aggregates shall consist of natural sands and gravels, crushed rock, or other inert substances having clean, uncoated grains of hard, strong, durable materials in accordance to the relevant British Standard.

3.3 Fine Aggregate for Concrete Works

Fine aggregate shall be natural sand or crushed gravel or stone; clean, sharp, coarse grit; pit or river sand; free from silt, dust, clay, salt or any other matter. All sand shall be washed and sieved as often as is required to make it conform to this Specification.

3.4 Coarse Aggregate

Coarse Aggregate shall be natural gravel, stone or other approved materials, hard strong and durable, nonporous, free from adherent coating or other harmful matter.

3.5 Water

Water used in the Works shall be free from oil, acid, alkali and any matter which is harmful to any material with which it is used. If available, a drinking water supply shall be used.

3.6 Surface Finishes

Concrete surfaces of paved areas shall have a finish similar to that left by a vibrated hardwood board, 50 mm thick, when used for screeding concrete to its proper level and profile immediately after disposition. Other exposed upper surfaces shall be floated with a wood float to a smooth finish. The floating shall be executed so as not to bring excess laitance or fine material to the surface.

3.7 Measurements of Ingredients

Aggregate shall be measured by volume except as otherwise specified or approved by the Programme Coordinator or his representative. Cement in standard sacks need not be weighed, but the use of fractional sacks will not be permitted.

3.8 Transporting of Concrete

The concrete shall be handled so that at the point of deposition it is of the specified quality and consistency, nothing having been added to it or lost from it since leaving the mixer, and segregation of the concrete ingredients is avoided.

3.9 Placing of Concrete

The Contract Manager or his representative may prohibit placing of concrete at any time when atmospheric conditions are not suitable.

All placing shall be done as rapidly and continuously as practicable until the unit of operation is complete or until satisfactory construction can be made as called for on the Drawings, or as permitted by the Contract Manager or his representative.

3.10 Compaction of Concrete

Concrete during and immediately after depositing shall be thoroughly compacted by means of tamping and hand spading.

3.11 Curing of Concrete

Until it has thoroughly hardened, concrete shall be protected from the harmful effects of wind, sun, temperature and variations of temperature, premature loading or deflection or impact, and aggressive groundwater.

Concrete surfacing to building and structures shall be cured by covering completely with a waterproof membrane.

3.12 Formwork

Formwork shall include all temporary or permanent moulds for forming the concrete, together with all temporary construction required for their support. The formwork must maintain the concrete in its correct position during placing, compaction, setting and hardening, without loss of any material, and provide against its own deformation under load.

All formwork must be removed without damage to the concrete.

3.13 Reinforcement

The Contractor shall procure reinforcing steel only from reputable manufacturers/suppliers. Reinforcing steel shall be of mild steel grade 250 or high yield steel grade 450/425 as indicated in the Drawings and must comply with BS 4449, BS 4461 or another approved standard. Steel fabrics shall comply with BS 4483.

The Contractor must inform the Engineer of the completion of any reinforcement in time, in order to facilitate its inspection and check of conformity with the Working Drawings well before the concreting. Relevant formalities shall be agreed upon between the Contractor and the Engineer at the appropriate time.

Reinforcing steel bars and fabrics shall be supplied in the standard lengths/sizes, straight.

SECTION 4 SITING, WELL DRILLING, PUMPING TEST AND DEVELOPMENT

4.1 General

The work covered by this section consist of borehole geophysical surveys and siting, drilling, well development, hand pump supply and installation, disinfection and construction of civil works (pump head base or plinth, and pump testing, drains, washing slab and soak away pit, etc.) in Blantyre district. These shall be constructed according to the Drawings, Specifications and Bill of Quantities and inclusive of all pertaining accessories necessary to complete the work.

The Contractor shall use an experienced Hydrogeologist with complete set of equipment to conduct geophysical surveys (Vertical Electrical resistivity Survey using Terameter or similar equipment) and determine the point for borehole drilling which shall be in accordance with the wishes of the community. Vertical Electrical Sounding results shall be interpreted and recommendations drawn by the Contractor to the approval of the Contract Manager or his representative.

4.2 Well Siting (Hydrogeological Assessment and Geophysical survey)

The Contractor must allow the community, DCTs and Employer's staff to be involved in siting of the boreholes. The contractor has to conduct hydrogeological assessment supported by geophysical survey work for all sites to verify the potential for ground water. Vertical Electrical resistivity Survey method can be used and the penetration depth should not be less than the recommended maximum drilling depth. However if the Contractor is not convinced that the site selected by the community has the required potential for ground water extraction, he has the responsibility, in consultation with the community, to locate a better site to the satisfaction of the community and Contract Manager or his representative. The Contractor is advised to make use of all available study documents and reports regarding assessment of ground water potential in the proposed drilling area. The Contractor shall submit the assessment report including VES curves and their interpretation to the Contract Manager prior to the start of the drilling work.

4.3 Drilling

4.3.1 Drilling Rig

A suitable rig capable of drilling boreholes of minimum diameters up to 200 mm and to a maximum depth of 80 meters shall be employed. The rig should have all the necessary accessories for rimming, fishing etc. It is also worth mentioning that a reasonable thickness of the subsurface formation is expected to be soft. Therefore, the drilling equipment and the method have to be capable of drilling through both soft and hard formations. The Contractor has to use temporary steel casing to drill in the upper soft formation.

The rig shall have air and water/mud flush facilities for drilling through the over burden and down-the-hole hammer facilities for drilling in hard rock.

4.3.2 Drilling Fluids

In all formation that will be encountered during drilling only air or approved type of foam may be used as drilling fluid if down-the-hole hammer bit is used. If boreholes are drilled with rotary equipment the following drilling fluids may be used:

a) Air
b) Air with foam
c) Clear water
d) Drilling mud composed of water and a thickening agent containing no solid particles.
   Examples are the starch based mud, Revert, and Polymer based mud such as Quick Thick. **Use of bentonite is specifically prohibited**.
   Mud cake formed during this activity has to be removed to the satisfaction of the Programme Coordinator or his representative.

4.3.3 Drilling Diameter

Drilling diameter of the production wells will vary depending on geological and hydrogeological set-up of the areas. However, the final inside diameter of any completed borehole section should not be less than 171 mm. All drilling should be carried out with the completion diameter of not less than 171 mm.

4.3.4 Well Depth

Well depths are envisaged to vary from one area to another depending on the geological conditions of the area, and the hydrogeological assessment and the survey results will determine the borehole depth. However, drilling may be ordered to be stopped at shallower depth, or to be continued to a maximum of 60 m. The Contractor's Hydrogeologist has the primary responsibility for determining drilling depths from the survey results. The Contractor is, therefore, required to provide drilling instructions including, the recommended drilling depths, with clear professional justification, in the borehole siting report to be submitted to the Contract Manager or his representative for approval prior to commencement of the drilling program.

The total depth to be drilled for each borehole will be determined from the results of the interim yield tests. The acceptable minimum yield for boreholes is **0.25 ℓ/sec** but drilling will continue beyond that depth assuming a continuing incremental increase in yield is indicated by the drilling results obtained beyond the initial 0.25 l/s attaining depth.

In all cases interim yield tests shall be performed as stated under Section 4.3.6.

4.3.5 Well Logging

The Contractor shall collect unwashed drilling samples at 3 m intervals and at every change of formation, and store the samples in heavy gauge polythene bags clearly labelled and kept on site until the completion of drilling and testing. The samples are to be logged by the driller and record of strata at 3 m intervals will be kept on a daily log sheet. The record of strata will show:

(a) lithology
(b) degree of consolidation or hardness
(c) If unconsolidated - nature of granular material (i.e. subjective description of grain size, degree of rounding, clay content, colour).
(d) in basement areas it is most important that the weathered rock/fresh bedrock transition point is noted.

Following attainment of the final depth details of the proposed borehole design should be submitted to the Contract Manager or his

representative. The completion of an effective and efficient borehole design is the responsibility of the contractor.

DRY BOREHOLES

The contractor shall seek instruction from the Engineer or his Representative if water is not struck within the specified depth where it is expected to strike water. No movement from site shall be permitted until the dry hole is notified by the Contractor or his representative to the Engineer or his representative and is approved as such by the Engineer or his representative.

The Contractor will be paid for wet boreholes only. All dry boreholes shall be at the expense of the contractor.

4.3.6 Interim Yield Tests

On striking water, interim yield tests must be initiated. These tests should be repeated at the contractor's discretion though flushing of the hole should take place after the drilling of every rod length. The method employed for establishing interim yields will be at the discretion of the contractor. Details should, however, be included in the Methods Statement. In general air lifting will be regarded as the ideal method for interim yield tests with measurement of the discharge being made by channelling the flow into either (i) a container of known volume and measuring the time taken to fill that container using a reliable stop watch; or (ii) a V notch weir of suitable dimension for the yield to be accurately established.

Interim tests should be carried out for at least 20 minutes to establish yields of less than 1.0 1/sec. Once a yield which is regarded as the optimum for the borehole is indicated, the test should be continued for at least 60 minutes to confirm the result.

The results of interim yield tests against a total depth at time of test must be recorded on drilling records.

4.3.7 Well Casings and Riser Pipes

Boreholes have to be lined with high impact-resistant Poly Vinyl Chloride (uPVC) plastic plain and slotted casings specifically manufactured for bore holes.

The casings, plain and slotted, shall be of class 10 and have an outer diameter of not less than 113 mm and each 3 m long. Similarly, riser pipes shall be uPVC class 16 with an outer diameter of 63 mm and in 3 metre lengths. All casings and riser pipes shall have socket and spigot joints. And all casings shall come with casing centralisers already fixed by manufacturers. Damaged and deformed pipes due to mishandling will not be accepted for installation. The casings shall be securely stored and protected from direct sunlight.

To ensure that the casing is central and vertical in the borehole and to provide a uniform

annular space for the filter pack, centralizers of suitable size shall be fitted to both casings and screens at minimum 3 m intervals as per the manufacturer's recommendation.

To avoid the flow of surface water into the well 1.0 meter length of the casing shall be kept above the ground surface.

Immediately after completion of the drilling operation the Contractor has to provide the well installation design, and actual casing and screen, for the approval by the Contract Manager or his representative. The Contractor shall only adopt design approved by the Contract Manager or his representative, but any approval that may be given will not relieve the Contractor of his responsibility for the proper execution of the Works.

Casing shall be installed in the sizes and depths as per the result of the well logging and final well design.

At least a 1m length of plain casing of the same diameter shall be installed below the slotted casing. The bottom of this plain casing shall be sealed with a suitable end cap/bail plug. Plain casing shall be installed from the depth at which water was struck to a height of 1m above the ground and capped.

The protruding casing must be sealed with a suitable cap to prevent any unauthorized opening until the hand pump is installed.

The inner diameter and wall thickness of the screen shall be the same as for the plain casing. The open area of the screens shall be at least 10% of the surface area of the pipe.

Slots, which are prepared by using hacksaw, are not allowed, and all slots have to be factory or machine made.

4.3.8 Gravel Pack

The Contractor shall be responsible for obtaining screened filter pack from the Ministry of Water and Sanitation, approved gravel pack source (Nkhuzi' Bay in Mangochi, Senga in Salima and Chilumba in Karonga). The pack should have a d50 size not exceeding 1.0 millimeter and a uniformity coefficient not greater than 2.0 (the contractor being responsible for grading). Ironstone or calcareous fragments in gravel packs are unacceptable. The gravel pack shall consist of well-rounded and washed round quartz grain and shall be placed in the annular space between the borehole wall and the outer portions of casings and screens, to the satisfaction of the Contract Manager or his representative.

To avoid bridging of the gravel, it is not allowed to fill-in the gravel by mechanized equipment. The gravel must be filled-in by hand slowly and carefully or by shovels during well development up to the level determined by the Contract Manager or his representative depending on the static water level.

Filling will proceed slowly and carefully during well development. The correct placing of gravel will have to be controlled by continuous recording of the volume of gravel consumed and by repeated measurement of the level of packing.

Where temporary drill casing has been installed, initial packing will continue inside the drill casing, prior to casing pull back, to a height of at least 1.5m above the base of the temporary casing.

Once initial placement of filter pack material has reached a height of 0.6m above the base of casing placement above screen, gentle well development shall commence.

Placement of gravel, temporary casing pull back and gentle well development will proceed until gravel is settled without bridging the

level to a height of 0.5m above the top of the screen. Gravel will be topped up as necessary during well development to maintain this level.

4.3.9 Well Development

Well development has to be carried out after completion of the construction of a well and prior to test pumping. The objective of development is to improve well performance, to increase well capacity and to reduce an unacceptable level of the amount of sediment contained in the water yielded by the well.

Well development shall be carried out using appropriate techniques (over pumping, surging, back washing, jetting etc) after casing installation and gravel packing and prior to pumping test. The work shall be carried out for a minimum of 4 hrs and to the satisfaction of the Contract Manager or his representative.

Development shall continue until five (5.0 No.) visually sand free water samples of at least 1 litre collected over five separate 1 minute periods at least 10 minutes apart should be obtained from the total discharge. (Actual sand tolerance will be 5 mg/1.)

Should such a sample not be obtained development shall continue up to a maximum of 8 hours. If 5 sand free samples cannot be obtained at this point the borehole will be considered to have an unsatisfactory design and construction. Periods of development in excess of the 8 hours on a borehole set out in the schedule of prices shall therefore be at the Contractor's expense.

During the development the gravel will be topped up as necessary to maintain the level in annulus at 3.0 meters below ground level.

4.3.10 Cement grouting

The annular space between borehole and wall of the casing shall be grouted with mixture of cement and water slurry by a pour-in method from the top. Before grouting takes place a bridging medium of sand and puddle clay should be placed on the gravel pack in order to avoid any cement infiltration into the gravel. A minimum amount of water shall be used to obtain desired workability. Cement grout should not be placed before the end of the pumping test to allow the gravel to settle and to be

filled-up as necessary. After the test pumping is completed the annulus between the surface casing and the wall of the well shall be sealed with cement grout containing no aggregate from a depth of 5m to the ground surface.

Cement grouting shall be carried out in one continuous operation before initial setting of the cement occurs. The Contractor shall advise the Contract Manager or his representative at the start of the drilling operation the method he intends to employ for grouting. Regardless of the method used, the grout shall be introduced at the bottom of the space to be grouted. In no circumstance will this be less than 5 m below the well head. The method proposed by the Contractor will be changed or modified if and as required to suit the site conditions.

4.3.11 Concrete Pad

The Contractor shall construct a concrete pad having concrete of **class 20MPa** for all productive boreholes to dimensions shown in the Drawings. The Contractor shall ensure that the sides of the pad are straight by properly anchoring the forms. The top of the pad shall be trowelled to provide good standing and easy drainage. The identification code number of the well provided by the Contract Manager or his representative has to be inscribed on the concrete pad.

The Contractor shall excavate and concrete the drainage channel for a distance of 10m down slope away from the centre of the borehole as shown in the plan view.

The materials used for the construction work shall have to satisfy the requirements of Section 2 of the Specification.

4.3.12 Well Disinfection

After drilling and clearing, wells should be disinfected to make sure that no bacteria, viruses and other pollutants are remaining in the well, which may have entered the well during drilling, construction and installation works.

4.3.13 Plumbness and Alignment

The borehole shall be tested for verticality and straightness using deviation measuring instruments like Inclinometer, Drift Indicator, etc, at any time when the Contract Manager or his representative may request that the alignment be checked.

The Contractor may also conduct these and any other tests he may deem necessary to satisfy himself that the borehole is being drilled plumb and straight. These tests shall be made entirely at the Contractor's own expense.

If the hole is out of alignment as determined by the dummy or more than 1% out of vertical, then the hole shall be abandoned and re-drilled.

4.4 *Pumping Test*

The Contractor shall supply at least 2 power generators of appropriate capacity to run the pumps. The Contractor shall have sufficient stand-by pumping sets and parts on the sites to guarantee uninterrupted pumping.

The equipment and crew shall be capable of performing a continuous test for up to 10 hours if required and shall include all necessary tools and equipment to carry out a pump test with accurate measurement of water flow and water level in the well.

Discharge measurements could be done either by standard v-notch, calibrated water meter or by simple container of known volume.

Pumping test result will not be accepted if interrupted due to negligence or technical defects of the pump, generator, or water level indicator and any other causes. The Contractor will repeat the test at his own expense.

Pumping test data shall be recorded on prepared sheets in the English language. The data sheets prepared in triplicate shall include the following information:

a) the location of the well being tested.

b) the physical characteristic of the well including depth, diameter, size and length of casing and screen.

c) characteristics of the test pump.

d) depth of setting of the test pump in meters.

e) date and time of start and finish of pumping test.

f) static water level at commencement of test, dynamic water levels and discharge rates at prescribed time intervals.

g) draw-down recovery immediately after pumping is completed.

h) date and time of start of removal of test pump from the borehole.

The pumped water during pumping test should not be allowed to form pools so as to avoid re-infiltration in the vicinity of the wells. The water should be disposed off by means of discharge pipes towards a nearby natural drain over a distance of at least 100 m downstream form the well being pumped.

4.5 *Pumping Test Procedures*

After development the water will be allowed to recover and stabilize prior to the pumping test process.

a) Interim yield test as stated under Section 4.3.6- in order to determine constant pumping test rate.

b) If the well yields below 0.25 l/s after the interim yield test the well is deemed to be dry well and has to be abandoned.

c) The constant discharge test as the name implies, must be run uninterruptedly for a maximum of 6 hours, or until such an earlier time when no further drawdown is achieved.

d) The recovery test shall be carried out until 90% percent recovery of the drawdown is attained.

e) Electric water level indictor has to be used for the measurements of the water level. The electric water level shall be provided with sound and light signals.

f) Discharge measurements could be done as stated in section 4.9.12 elsewhere in the Specification.

g) No bulk spilling of water is allowed to re-infiltrate in the vicinity of the well. The discharged water has to be carried away by means of discharge pipe towards a natural drain.

h) Water samples shall be collected for analysis as stated under Section 4.6.

For boreholes to be equipped with hand pumps, the test pumping will take the form of a continuous discharge test (Constant Yield Test) at the discharge rate to be determined during development of the borehole. The discharge rate shall not be less than the minimum acceptable yield of 0.25litres per second. The minimum period of the test shall be 180 minutes. The test will however stop after the pumping water level stabilizes or until the maximum period for test of 360 minutes has been reached.

For boreholes to be motorized, the test pumping shall take the form of a Step Test of 400 minutes duration using 100 minutes each step. This will be followed by an aquifer test at a constant discharge rate for a period not less than 720 minutes. The test will continue until the pumping water level stabilizes or the maximum acceptable period of 1440 minutes is reached.

At the end of either form of test, recovery shall be taken until either the well recovers in full or a period of 120 minutes elapses, whichever is the earlier.

For Step Tests, the discharge rates shall be based on the results of the Interim Yield tests. The rates should be close to 50%, 70%, 100% and 150% of the expected long-term yield. Where the Contractor fails to achieve requirements of the Step Test, the results will be treated as an aquifer test and the Contractor will be paid accordingly.

In cases where a yield higher than the minimum 0.25 litre per second is not sustainable for the period of the constant yield test pumping at the sustainable yield shall be 360 minutes.

In all cases draw down reading shall be taken at the following time intervals using an electric or alternative water level dipper graduated at 0.01metre intervals. The datum point for measurements shall be recorded plus the height of the datum above ground level.

The time intervals for the Step Test and Constant Yield Test shall be as follows:

(a) **Step Test:**

one minute intervals from 0 - 10min;

two minute intervals from 10 - 30min;

five minute intervals from 30 - 100min.

(b) **Constant Yield Test:**

one minute intervals from 0 - 10min; two minute intervals from 10 - 30min; five minute intervals from 30 - 100min; ten minute intervals from 100 - 200min; twenty minute intervals from 200 - 400min; fifty minute intervals from 400 - 600min; hundred minute intervals from 600 - 1500min.

In all cases recovery shall be recorded, at the same time interval as above, until either full recovery has been attained or a period of time equivalent to the pumping period has passed.

4.6 *Water Sampling and Quality Test*

To ensure that water being delivered from the newly drilled boreholes is potable, the contractor shall be required to carry out quality tests on the water samples. “Water quality” is a term used here to express the suitability of water to sustain uses or processes.

A sample of water from the borehole shall be taken at the end of the constant rate test for Physical, Chemical and Bacteriological analyses. The physical and chemical analysis would determine the following: pH, temperature, colour, turbidity, total dissolved solids (TDS), Calcium, Magnesium, Sodium, Potassium, Total Iron, Manganese, Bicarbonate, Sulphate, Chloride, Nitrate, Nitrite, Fluoride, and Total Hardness.

The bacteriological analysis would determine Total Coliform and E. Coliform. The laboratory water tests may be carried by any other laboratory as the Contractor may wish but the results will have to be checked by the District Coordinating Teams.

Each sample consists of 2 containers, one in a calibrated, hermetically closed glass or suitable plastic container of 1 litre capacity. Water samples should be clearly marked showing name and number of well, date of sampling, hour of sampling, temperature of water during sampling and signature of person taking the sample.

Samples will be stored in a cool place and delivered within 24 hour to the Central Water Laboratory in Lilongwe, Mzuzu or Blantyre or any other laboratory acceptable to the Employer as the Contractor may wish to choose.

If water samples collected during drilling show that the water is not of suitable quality for domestic use, the well will be abandoned. The Contractor will be paid for the completed work as per the rates in the Bill of Quantities considering the well as successful one.

COMMUNICATION

The Contractor shall communicate at least weekly by telephone and in writing with theContract Manager or his representative, detailing the progress achieved.

4.7 *Supervision Work*

The communities through their water committee members or Water Users Association members, with the assistance of the representative of the Contract Manager, representative of DCTs , will be actively engaged in the supervision of all aspects of the contract to their capacity in addition to the supervision provided by the Contract Manager land/or his

representative. The Contractor shall facilitate involvement of the water committee members in the supervision work and during the installation of hand pumps.

4.8 *Work Sheets and Records*

The Contractor shall maintain a work-sheet in which all the information concerning the works would be recorded, sample of daily recording format is attached. This would enable the Programme Coordinator or his representative to be precisely informed on the drilling activities upon arrival at site. The work-sheets will contain the following information:

A) GENERAL INFORMATION

i. Traditional Authority Area
ii. Village Name
iii. Grid reference (UTM format) iv. Borehole number
v. Distance from previous destination
vi. Contractors Name vii. Date arrival on site
viii. Date of starting drilling
ix. Consultants/supervisor's Name and signature

B) DRILLING RIG

i. Registration number of Equipment
ii. Make model, type and size of drilling rig
iii. Type of work performed and number of hours on each type of work iv. Names of all crew members
v. Size of hole and number of meters drilled per shift
vi. Penetrated sample description
vii. Length and size of casing installed.

viii. Length and size of screen installed. ix. Length and size of observation pipe installed.

x. Problems encountered during drilling. xi. Total standby time, and.

xii. Other site specific items as appropriate

C) TEST PUMP UNIT

i. Location.

ii. Make, model and capacity of test pump. iii. Type of work performed and number of hours on each type of work.

iv. Names of all crew members.

v. The static water level.

vi. Pump position during testing.

vii. Total duration of the pumping test operation

viii. Total standby time,

ix. Other site specific items as appropriate

4.9 *Final Reports*

After completion of each well (drilling, development, pumping test, etc.) the Contractor has to submit a final technical report prepared in English incorporating all important results of specific activities in three copies. The report should be counter signed by DCTs and respective target Community representatives.

The report should include the details of the following points:

- Siting of water wells including GPS readings
- Description of VES data, including resistivity graphs and interpretations
- Recommendations on the possible aquifer depth and depth of drilling

- Equipment and instruments used for the drilling operation,
- Description of borehole logging results,
- Final well design for the installation of casings and screens,
- Equipment and instruments used for the pumping test operation,
- Data collection sheets of the pumping test and relevant remarks about the data acquisition,
- Static and dynamic water levels,
- The plotted pumping test graphs,
- Description about the analytical methods and the relevant calculations and the interpretation of pumping test results,
- Recommended pump position and yield,
- Water quality analysis and test result, and well disinfection,
- Description of the well construction should have to include quantity of materials used for the well, well head and pump complete,
- The final report has to contain remarks on special observations, difficulties encountered and findings that would be followed by interpretation of results and proposed recommendations.

4.10 *Measurement and Payment*

4.10.1 Mobilization and Demobilization

Payment for mobilization and demobilization shall be made on Lump sum bases as specified in the Bills of Quantities.

The price shall include the complete mobilization of the necessary drilling equipment, materials and crew from and to the Contractor's yard and to and from the working areas including the construction of temporary roads required for access to the working areas, inter site mobilization, and the complete installation of the equipment. It also includes clean-up of the sites, restoration and clean-up of anything disturbed by the construction and use of the temporary access roads.

4.10.2 Borehole Siting

Payment for borehole siting will be made on lump sum basis for all activities performed and equipment used and any other incidentals there including the report only for each successful well after the drilling is

completed and the well is accepted as successful by the Programme Coordinator.

4.10.3 Drilling

Drilling works shall be measured and paid per linear metre as specified in the Drawings and Bills of Quantities.

Measurement will be made vertically to the nearest 0.1m from the original ground level to the base of the completed hole. This price will include all materials, equipment, cutting, welding, labour and all work incidentals thereto except for those items for which payment is specified additionally to that of the drilling.

No payment will be made for boreholes abandoned or incomplete as a result of lost or stuck tools, stuck casing, failure to meet plumpness or alignment tests, or any other reason that is the fault of the Contractor.

In all other cases, dry holes shall be at the expense of the Contractor. No payment will be made for abandoned or dry boreholes.

4.10.4 Well Casing

Well casing shall be measured and paid per linear metre as specified in the Drawings and Bills of Quantities.

Measurement will be made to the nearest 0.1 meter vertically from the top flange of the well head to the bottom of the casing in the borehole less any section of screen, which is paid for separately. This price shall include supply and secure storage of casing, cleaning fluid, solvent cement and couplings, welding, installation, testing and all work incidentals thereto. No payment will be made for temporary casing, which is installed to facilitate drilling and is subsequently to be removed. No payment will be made for well casing installed in abandoned boreholes.

4.10.5 Casing Bottom Cap or Bail Plug

Casing bottom cap shall be measured and paid per number or item as specified in the Drawings and Bills of Quantities

This price shall include supply, installation, testing and all work incidentals thereto.

4.10.6 Gravel Pack

Gravel pack shall be measured and paid per cubic metre as per the Bills of Quantities.

This price shall include supply, installation, testing and all work incidentals thereto.

4.10.7 Well Heads or Concrete Pad

Payment for well heads will be made on Lump Sum basis per well head as specified in the Bill of Quantities. This price shall include materials, excavation, prefabrication, installation, soak away, drainage, backfilling, site grading and all work incidentals thereto. It also includes supply and placement of sand and paddle clay seal.

4.10.8 Grouting

Payment for grouting will be made at the unit price per meter shown in the Bill of Quantities.

Measurement will be made vertically to the nearest 0.1 m. from the top to the bottom of the completed grouting. This price shall include materials, installations and all work incidentals thereto.

4.10.9 Well Development

Payment for well development will be made at the price per hour shown in the Bill of quantity. The price will include materials, equipment and all work incidentals thereto.

4.10.10 Plumbness and Alignment Test

Payment for plumbness and Alignment Tests if requested by the Contract Manager or his representative will be made at the price per well

site shown in the Bill of Quantities. The price will include material, equipment and all work incidentals thereto. No payment will be made for tests carried out by the Contractor for his own information.

4.10.11 Pumping Test

Payment for pumping test will be made at the unit price per hour shown in the Bill of Quantities.

No payment will be made for tests terminated prior to the time specified by the Contract Manager or his representative or rendered unsatisfactory by reason of breakdown, lack of fuel or for any other reason that is the responsibility of the Contractor. The price shall include materials, equipment and work incidental thereto.

4.10.12 Monitoring Recovery

Payment for monitoring recovery will be made at the unit price per hour shown in the Bill of Quantity.

No payment will be made for monitoring terminated prior to the time specified by the Contract Manager or his representative or rendered unsatisfactory by reason of breakdown, lack of fuel or any other reason that is the responsibility of the Contractor. The price shall include materials, equipment and all work incidentals thereto.

4.10.13 Well Disinfection

Payment for well disinfection will be made on Lump sum basis per well as shown in the Bill of Quantities. The price will include supply of chlorine, equipment and all work incidentals thereto.

4.10.14 Final Report Production

Payment for Final Reports will be made at unit price per productive well Reported.

C. Technical schedule of particulars

Contractors should enter full particulars of equipment which shall be used. General entries of equipment held by the Contractor but which will not be available for definite allocation to the contract should not be included. It should be noted that the time of, but prior to, the tender award the first choice contractor shall be asked to firmly guarantee the availability of the equipment described as a pre-condition for the final tender award.

1. **DRILLING RIGS**
   Number
   Type
   Make
   Model
   Age (include hours worked)
   Gross Nos
   (Allocated rigs)

2. **Foam Pump Type**

3. **MUD PUMP**
   Type
   Make

4. **Drill String** Drill pipe (mm) Pipe Length
   O.D. joint (mm)
   Drill Collar
   Quantity
   Length (mean) (m)
   Stabilizers
   Quantity
   Max O.D

5. **COMPRESSOR**
   Number
   Make
   Free air delivery
   Normal effective working pressure

6. **Auxiliary Equipment – List**

7. **Development method proposed with tool design**

8. TEST PUMPS

TYPE

Make

Length runaway main/lay float

Discharge measurement methods.

SECTION C: SCHEDULE OF RATES AND PRICES (TO BE PRICED BY BIDDER)

For Contracts where Payment is to be based on Quantities of Work actually performed at the unit rates quoted

Item No.	Description of Work with associated goods (CONSTRUCTION OF CHIFUCHAMBEWA SOLAR POWERED WATER SUPPLY PROJECT AT GVH CHIFUCHAMBEWA IN T/A KHOMBEDZA SALIMA DISTRICT)	Unit of Measure	Estimated Quantity	Unit Price in Kwacha	Total Price in Kwacha
1	As Per attached BOQs				
			Total Estimated Price		

The following attachments are appended to clarify the Description of Work:
[*List each attachment e.g. drawings and detailed technical specifications*]

Authorised By:

Signature: _____ Name: _____

Position: _____ Date: _____
(DD/MM/YY)

Authorised for and on behalf of:

Company: _____

BILLS OF QUANTITTIES FOR SOLAR POWERED WATER SUPPLY RETICULATION OF HIGH YIELD BOREHOLE- CHIFUCHAMBEWA VILLAGE IN TA KHOMBEDZA, SALIMA						
ITEM No.		**STANDARDS/SPECIFICATIONS**	**UNIT**	**quantity**	UNIT COST	**AMOUNT**
1.0	**PRELIMINARIES AND GENERAL**					
1.1	Contractor's Mobilization and Demobilization		LS	1		
1.2	Provide for system pressure testing		LS	1		
1.3	Water abstraction Levy (Paid to National Water Resource Authority)	Already done by council	LS	1		
	SUB-TOTAL CARRIED TO BID SUMMARY					
2.0	**BOREHOLE CONSTRUCTION**					
2.1	Conduct a geophysical survey for the purpose of locating underground water. The survey report should indicate the rock formation and expected depth at which water can be struck	Already done by council	LS	1		
2.2	Drilling 140mm diameter borehole from 0-39m, minimun of 0.5l/s		m	39		
2.3	Drilling 140 mm diameter borehole from 39-63m, min 0.5l/s		m	24		
2.4	Supply and Install uPVC plain class 10 pipes with to a finished diameter of 140mm	ISO 1452-2:2009, ISO/TR 4191:2014,ISO 4427-1:2009	m	48		
2.5	Supply and Install uPVC slotted pipes (screen) class 10 to a finished diameter of 140mm	ISO 1452-2:2009, ISO/TR 4191:2014,ISO 4427-1:2009	m	15		
2.6	Supply and install 140mm end caps	ISO 1452-2:2009, ISO/TR 4191:2014,ISO 4427-1:2009	No.	2		
2.7	Supply and place 2-4mm gravels, packed,	GS 1118:2016	ton	2		
2.8	Supply cement, mix and place grout seal above gravel,	Cement: BS 12	m	1		

2.9	Including any appropriate borehole development methodology and or combination of borehole development methods to develop water to clarity (e.g. air lifting, mechanical surging, high velocity jetting, backwashing, over-pumping	As specified in SOPs for Ground Water Development	hours	4		
2.1	Conduct minimum 8-hour constant rate discharge test on hand pump (Constant yield pumping test)	As specified in SOPs for Ground Water Development	hours	8		
2.11	Conduct up to 90% recovery test on hand pump boreholes	As specified in SOPs for Ground Water Development	hours	4		
2.12	Carry out detailed water quality test (Physical, chemical and Biological tests by the Central Water Laboratory)	As specified in SOPs for Ground Water Development	Ls	1		
	SUB-TOTAL CARRIED TO BID SUMMARY					
3.0	**SOLAR POWER AND PUMP WORKS**	-				
3.1	Supply and install Grundfos Submersible Water Pump SP 5A-21	Product No. 5001921	No.	1		
3.2	Supply and install Grundfos Control Switch - Change-over Automated	ISO 82219307	No.	1		
3.3	Supply and install AFC or equivalent High Voltage Panel - minimum of 330 walts, open secuit voltage min 36V	IEC 61724-1, ISO 9060, ISO/IEC 17025	No.	10		
3.4	Supply and install HDPE and Nylon Rope fittings and accessories	ISO 1452-2:2009, ISO/TR 4191:2014,ISO 4427-1:2009	m	100		
3.5	Supply and install 4 core, 4 mm armoured cable by approved cable manufacturer		m	120		
3.6	Supply and install 4 core, 10 mm armoured cable by approved cable manufacturer		m	140		
3.7	Supply and install lightning arrestor		set	1		
3.8	Supply and install earth rod and accessories		set	1		
3.9	Supply and install Various Electrical Accessories		LS	1		

3.8	Fabricate, provide and install steel frame panel stands on approved site and firmly secured in Razor diamond fence		LS	1		
3.9	Supply submersible cable 4mm, 3 core		m	63		
	SUB-TOTAL CARRIED TO BID SUMMARY					
4.0	**RETICULATION SYSTEM**	-				
4.1	Supply and install all in PPR Pipes, fittings and accessories	ISO 1452-2:2009, ISO/TR 4191:2014,ISO 4427-1:2009		1		
4.2	63 mm dia PPR Inlet pipe		m	12		
4.3	63mm dia. PPR Outlet pipe		m	12		
4.4	63mm dia. PPR Overflow and Washout pipe		m	6		
4.5	1" PPR pipe		m	63		
4.6	3/4" Cobra Taps (chrome or similar non-corrossive material)	ASTM A999/A999M-18,ISO 15875-3:2003, SANS 226:2009, SANS 1480:2005, BS 1010, BS/EN 1286	No.	12		
	Provide and install in HDPE Pipe, fittings and accessories	ISO 1452-2:2009, ISO/TR 4191:2014,ISO 4427-1:2009	LS			
4.7	63mm dia. HDPE Class 15		M	50		
4.8	50mm dia. HDPE Class 16		M	760		
4.9	40mm dia.HDP Class 16		M	770		
4.10	32 mm dia. HDPE Class 16		M	10		
4.11	Supply and install Chlorination system in a concrete manhole with lockable metal cover. The cost to include the construction of the manhole as per the drawings and supply of pool testers for measuring the free residuals chlorine in the water and chlorine tablets for one year of the defect liability period.	Refer to drawings in annex 2 for the techncial design	LS	1		
	SUB-TOTAL CARRIED TO BID SUMMARY					
5.0	**OVERHEAD STORAGE TANK AND MISCELLANEOUS**	-				
	-	-				

5.1	Overhead Tank stand minmum 6m above ground level and built in cement blockwork with re-inforced top support slab and access ladders with cage as per drawing (min block strenght 5N/mm2)	Cement: BS 12, Concrete: BS 8500	No.	1		
5.2	Provision of formwork (19mm block boards, timber and supporting poles)		M2	32		
5.3	Supply and install 10,000 litre plastic water storage tanks with accessories as shown on drawing.*(Preferably MacSteel Tanks) Or LOTTO*	SAA AS/NZS 4766-2006, ASTM D1998-21	No.	4		
5.3	Construct 2 Tap apron (Kiosks) with cement blocks 150x150x400 as per drawing complete with soakaway as shown on drawing	for 2 Bib tap kiosk length is 1500mm and include waste water management structures	No.	7		
5.4	Provide PVC and Stainless steel based water meters to each Kiosk (1 meter to measure production and 7 consumption)	ISO 4064-1:2014	No.	8		
5.5	Construct with cement block 150x150x400mm and plaster 700x500x500mm manhole with concrete reinfonced lockable covers, to accommodate water flow meters		No.	7		
5.6	Construct 800mm x800mmx800mm reiforced concrete with Y12 bars structure to seal BH point with provision of 25mm airation pipe	BH PVC must be min of 300mm above the groud (fix base plate at min 300mm above the ground)	N0	1		
5.7	Provide PPR or PVC 63mm gatevalve to each to mainline		N0	1		
5.8	Provide PPR or PVC 50mm gatevalve to each main distribution line		N0	2		
5.9	Provide PPR or PVC 40mm gatevalve to some designated kiosks		N0	3		
5.10	Provide PPR or PVC 32mm gatevalve to designated kiosks		N0	2		

5.11	Capacity building (three sessions), manual on operation and maintenance, tools (Screw drivers set,3 adjustable pipe wrenches, wire cutters, insulation 5 meter long, 2 units of thread tap, pliers, One crawl hammers, One ordinary hammer) for maitenance and layout of the water system and solar system	All maintenance tools meeting SABS standards	LS	1		
BID SUMMARIES						
SERIES						
No.						
	MEASURED CONTRACT WORKS					
1	PRELIMINARIES AND GENERAL					
2	BOREHOLE DRILLING					
3	SOLAR POWER AND PUMP WORKS					
4	RETICULATION SYSTEM					
5	OVERHEAD STORAGE TANK AND MISCELLANEOUS					
	SUB - TOTAL					
	Sub Total For 1 BH Mechanisation					
	Add 16.5% Value Added Tax (VAT)					
	Add 1% NCIC Levy					
	Add 1% PPDA Levy					
	Bid Total Price For 1 BH Mechanisation					
	Add 5% Contingency					

construction of chifuchambewa solar powered water supply project at gvh chifuchambewa in t/a khombedza salima district