



CENTRAL RIFT VALLEY WATER WORKS DEVELOPMENT AGENCY

TENDER DOCUMENT FOR

OL KALOU BOREHOLES WATER SUPPLY PROGRAMME

**PROCUREMENT OF WORKS FOR DRILLING, EQUIPPING AND CIVIL
WORKS FOR ABORETUM BOREHOLE WATER PROJECT IN
NYANDARUA COUNTY**

TENDER NO. CRVWDA/NYA/OBWSP/ABORETUM/2020-2021

FUNDED BY: GOVERNMENT OF KENYA

OCTOBER 2020

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INVITATION TO TENDER NOTICE

The Central Rift Valley Water Works Development Agency (CRVWWDA) has received funds from the Government of Kenya under the Ol Kalou Boreholes Water Supply Programme to undertake the project mentioned below. This is therefore to invite qualified contractors to submit sealed Bids for the tenders as shown below.

Tender no.	Project name	Project scope	County	Category and class of registration
TENDER NO. CRVWWDA/NYA/O BWSP/ABORETUM /2020-2021	Aboretum Borehole Water Preoject	<ul style="list-style-type: none">• Drilling of 1No 8" Ø borehole 200m deep• Pumping System & Solar Equipment with a submersible pump Provisional Sum of Kshs.3,000,000• Construction of 1No 24m³ steel tank on 18m high Steel Tower• Construction of Water Kiosk• Fencing of Borehole Site 200m and Steel Gate• Installation of Token system for water purchase	Nyandarua	NCA 7 and above Civil/Water Works

Obtaining bidding documents

Interested contractors may **freely** download tender documents them from Agency's website www.rvwwda.go.ke or at <https://tenders.go.ke>. PPIP portal, the bidders who download the document can send their details to procurement@rvwwda.go.ke

Submission

Complete tender document marked the tender No. must be delivered to the tender box situated at the address below by the date indicated below **at 12:00 Noon**. The bids must be dully serialized.

The bids will be opened at **12.05 hours** local time on **18th November, 2020** in presence of the bidders who choose to attend, bidders' representatives who chose to attend must submit written authorization from the firms they are representing.

The address referred to above is:

Chief Executive Officer
Central Rift Valley Water Works Development Agency
Maji Plaza, Prisons Road
P.O. Box 2451-20100 Nakuru, Kenya
Mobile No. 0718-313557
E-mail: info@rvwsb.go.ke

ABBREVIATIONS AND ACRONYMS

CDS	Contract Data Sheet
GCC	General Conditions of Contract
IFT	Invitation for Tender
ITT	Instruction to Tenderers
PE	Procuring Entity
PM	Project Manager
PPADA 2015	Public Procurement and Asset Disposal Act, 2015
PPDR 2020	Public Procurement and Disposal Regulations, 2020
PPRA	Public Procurement Regulatory Authority
STD	Standard Tender Documents
SOR	Statement of Requirements
SP	Service Provider
TDS	Tender Data Sheet
VAT	Value Added Tax

SECTION II: INSTRUCTIONS TO TENDERERS (ITT)

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A. Introduction

- 1. Scope of Tender**
- 1.1** The Procuring Entity indicated in the **Tender Data Sheet** (TDS) invites Tenders for the construction of works as specified in the **Tender Data Sheet** and Sections VI (Technical Specifications) and VII (Drawings).
- 1.2** The successful Tenderer will be expected to complete the works by the required completion date specified in the **Tender Data Sheet**.
- 1.3** The objectives of the works are listed in the **Tender Data Sheet**. These are mandatory requirements. Any subsequent detail is offered to support these objectives and must not be used to dilute their importance.
- 2. Source of Funds**
- 2.1** The Government of Kenya has set aside funds for the use of the Procuring Entity named in the **Tender Data Sheet** during the Financial Year indicated in the **Tender Data Sheet**. It is intended that part of the proceeds of the funds will be applied to cover eligible payments under the contract for the works as described in the **Tender Data Sheet**.
- Or**
- The Government of Kenya through Procuring Entity named in the **Tender Data Sheet** has applied for/received/ intends to apply for a [loan/credit/grant] from the financing institution named in the **Tender Data Sheet** towards the cost of the Project named in the **Tender Data Sheet**. The Government of Kenya intends to apply a part of the proceeds of this [loan/credit/grant] to payments under the Contract described in the **Tender Data Sheet**.
- 2.2** Payments will be made directly by the Procuring Entity (or by financing institution specified in the **Tender Data Sheet** upon request of the Procuring Entity to so pay) and will be subject in all respects to the terms and conditions of the resulting contract placed by the Procuring Entity.
- 3. Eligible Tenderers**
- 3.1** A Tenderer may be a natural person, private or public company, government-owned institution, subject to sub-Clause 3.4 or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a joint venture, consortium, or association. In the case of a joint venture, consortium, or association, unless otherwise specified in the **Tender Data Sheet**, all parties shall be jointly and severally liable.
- 3.2** The Invitation for Tenders is open to all suppliers as defined in the Public Procurement and Disposal Act, 2005 and the Public

Procurement and Disposal Regulations, 2006 except as provided hereinafter.

- 3.3** National Tenderers shall satisfy all relevant licensing and/or registration with the appropriate statutory bodies in Kenya, such as the Ministry of Public Works or the Energy Regulatory Commission.
- 3.4** A Tenderer shall not have a conflict of interest. All Tenderers found to have a conflict of interest shall be disqualified. A Tenderer may be considered to have a conflict of interest with one or more parties in this Tendering process, if they:
- a) Are associated or have been associated in the past directly or indirectly with employees or agents of the Procuring Entity or a member of a board or committee of the Procuring Entity;
 - b) Are associated or have been associated in the past, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring Entity to provide consulting services for the preparation of the design, specifications and other documents to be used for the procurement of the works under this Invitation for Tenders;
 - c) Have controlling shareholders in common; or
 - d) Receive or have received any direct or indirect subsidy from any of them; or
 - e) Have the same legal representative for purposes of this Tender; or
 - f) Have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Tender of another Tenderer, or influence the decisions of the Procuring Entity regarding this Tendering process; or
 - g) Submit more than one Tender in this Tendering process; however, this does not limit the participation of subcontractors in more than one Tender, or as Tenderer and subcontractor simultaneously.
- 3.5** A Tenderer will be considered to have a conflict of interest if they participated as a consultant in the preparation of the design or technical specification of the project and related services that are the subject of the Tender.
- 3.6** Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Kenya in accordance with GCC sub-Clause 3.2.

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- 3.7 Government owned enterprises in Kenya may participate only if they are legally and financially autonomous, if they operate under commercial law, are registered by the relevant registration board or authorities and if they are not a dependent agency of the Government.
- 3.7 Tenderers shall provide such evidence of their continued eligibility satisfactory to the Procuring Entity, as the Procuring Entity shall reasonably request.
- 4. One Tender per Tenderer**
- 4.1 A firm shall submit only one Tender, in the same Tendering process, either individually as a Tenderer or as a partner in a joint venture pursuant to ITT Clause 5.
- 4.2 No firm can be a subcontractor while submitting a Tender individually or as a partner of a joint venture in the same Tendering process.
- 4.3 A firm, if acting in the capacity of subcontractor in any Tender, may participate in more than one Tender but only in that capacity.
- 4.4 A Tenderer who submits or participates in more than one Tender (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the Tenders in which the Tenderer has participated to be disqualified.
- 5. Alternative Tenders by Tenderers**
- 5.1 Tenderers shall submit offers that comply with the requirements of the Tendering documents, including the basic Tenderer's technical designs indicated in the specifications and Drawings and Bill of Quantities. Alternatives will not be considered, unless specifically allowed for in the **Tender Data Sheet**. If so allowed, sub-Clause 5.2 and 5.3 shall govern.
- 5.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the **Tender Data Sheet** as will the method of evaluating different times for completion.
- 5.3 If so allowed in the **Tender Data Sheet**, Tenderers wishing to offer technical alternatives to the requirements of the Tendering documents must also submit a Tender that complies with the requirements of the Tendering documents, including the basic technical design as indicated in the specifications. In addition to submitting the basic Tender, the Tenderer shall provide all information necessary for a complete evaluation of the alternative by the Procuring Entity, including technical specifications, breakdown of prices, and other relevant details. Only the technical alternatives, if any, of the lowest evaluated

Tenderer conforming to the basic technical requirements shall be considered by the Procuring Entity.

6. Cost of Tendering

6.1 The Tenderer shall bear all costs associated with the preparation and submission of its Tender, and the Procuring Entity shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Tendering process.

7. Site Visit and Pre-Tender Meeting

7.1 The Tenderer, at the Tenderer's own responsibility and risk, is advised to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Tenderer's own expense.

7.2 The Procuring Entity may conduct a site visit and a pre-Tender meeting. The purpose of the pre-Tender meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

7.3 The Tenderer's designated representative is invited to attend a site visit and pre-Tender meeting which, if convened, will take place at the venue and time stipulated in the **Tender Data Sheet**.

7.4 The Tenderer is requested as far as possible, to submit any questions in writing or by electronic means to reach the procuring Entity before the pre-Tender meeting. It may not be practicable at the meeting to answer all questions, but questions and responses will be transmitted in accordance with sub-Clause 7.5.

7.5 Minutes of the pre-Tender meeting, including the text of the questions raised and the responses given together with any responses prepared after the pre-Tender meeting will be transmitted within the time stated in the **Tender Data Sheet** to all purchasers of the Tendering documents. Any modification of the Tendering documents listed in sub-Clause 8.1 that may become necessary as a result of the pre-Tender meeting shall be made by the Procuring Entity exclusively through the issue of an Addendum pursuant to ITT sub Clause 10.2 and not through the minutes of the pre-Tender meeting.

7.6 Non attendance during the site visit or pre-Tender meeting will not be a cause for disqualification of a Tenderer unless specified to the contrary in the **Tender Data Sheet**.

B. Tendering Documents

8. Content of Tendering Documents

- 8.1 The works required, Tendering procedures, and contract terms are prescribed in the Tendering Documents. In addition to the Section I Invitation for Tenders, Tendering documents which should be read in conjunction with any addenda issued in accordance with ITT sub Clause 10.2 include:
- Section II Instructions to Tenderers
 - Section III Tender Data Sheet
 - Section IV General Conditions of Contract
 - Section V Contract Data Sheet
 - Section VI Specifications
 - Section VII Drawings
 - Section VIII Bill of Quantities
 - Section IX Forms of Tender
 - Form of Tender
 - Appendix to Tender
 - Confidential Business Questionnaire
 - Integrity Declaration
 - Letter of Acceptance
 - Form of Contract Agreement
 - Section X Forms of Security
 - Tender Security Form
 - Tender Securing Declaration
 - Performance Bank or Insurance Guarantee
 - Advance Payment Guarantee
 - Section XI Form RB 1 Application to Public Procurement Administrative Review Board
- 8.2 The number of copies to be completed and returned with the Tender is specified in the **Tender Data Sheet**.
- 8.3 The Invitation for Tenders (Section I) issued by the Procuring Entity is not part of the Tendering Documents and is included for reference purposes only. In case of discrepancies between the Invitation for Tenders and the Tendering Documents listed in sub-Clause 8.1 above, the said Tendering Documents will take precedence.
- 8.4 The Procuring Entity is not responsible for the completeness of the Tendering Documents and their addenda, if they were not obtained directly from the authorized staff of the Procuring Entity.
- 8.5 The Tenderer is expected to examine all instructions, forms, terms and specifications in the Tendering documents. Failure to furnish all information required by the Tendering Documents or to submit a Tender substantially responsive to the Tendering documents in every respect will be at the Tenderer's risk and may result in the rejection of its Tender.

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- 9. Clarification of Tendering Documents**
- 9.1** A prospective Tenderer requiring any clarification of the Tendering documents may notify the Procuring Entity in writing, e-mail or facsimile at the Procuring Entity's address indicated in the **Tender Data Sheet**.
- 9.2** The Procuring Entity will within the period stated in the **Tender Data Sheet** respond in writing to any request for clarification provided that such request is received no later than the period indicated in the **Tender Data Sheet** prior to the deadline for the submission of Tenders prescribed in sub-Clause 22.1.
- 9.3** Copies of the procuring entity's response will be forwarded to all Purchasers of the Tendering documents, including a description of the inquiry, but without identifying its source.
- 9.4** Should the Procuring Entity deem it necessary to amend the Tendering documents as a result of a clarification, it shall do so following the procedure under ITT Clause 10.
- 10. Amendments of the Tendering Documents**
- 10.1** Before the deadline for submission of Tenders, the Procuring Entity may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Tenderer, modify the Tendering documents by issuing addenda.
- 10.2** Any addendum issued shall be part of the Tender documents pursuant to sub-Clause 8.1 and shall be communicated in writing, by e-mail or facsimile to all who have obtained the Tendering documents directly from the Procuring Entity.
- 10.3** In order to allow prospective Tenderers reasonable time in which to take an addendum into account in preparing their Tenders, the Procuring Entity at its discretion shall extend, as necessary, the deadline for submission of Tenders, in accordance with sub-Clause 22.2

C. Preparation of Tenders

- 11. Language of Tender**
- 11.1** The Tender, and all correspondence and documents related to the Tender exchanged by the Tenderer and the Procuring Entity shall be written in the Tender language stipulated in the **Tender Data Sheet**. Supporting documents and printed literature furnished by the Tenderer may be in another language provided they are accompanied by an accurate translation of the relevant passages in the above stated language, in which case, for purposes of

interpretation of the Tender, the translation shall prevail.

12. Documents Constituting the Tender

- 12.1** The Tender submitted by the Tenderer shall consist of the following components:
- a) The Form of Tender (in the format indicated in Section IX) completed in accordance with ITT Clause 15, 16 and 17;
 - b) Information requested by Instructions to Tenderers ITT sub-Clause 13.2; 13.3 and 13.4;
 - c) Tender Security or Tender Securing Declaration in accordance with Instructions to Tenderers ITT Clause 19;
 - d) Priced Bill of Quantities;
 - e) Qualification Information Form and Documents;
 - f) Alternative offers where invited in accordance with Instructions to Tenderers ITT Clause 5;
 - g) Written confirmation authorizing the signatory of the Tender to commit the Tenderer in accordance with Instructions to Tenderers ITT sub Clause 19.2; and
 - h) And any information or other materials required to be completed and submitted by Tenderers, as specified in the **Tender Data Sheet**.

13. Documents Establishing Eligibility and Qualifications of the Tenderer

- 13.1** Pursuant to ITT Clause 13, the Tenderer shall furnish, as part of its Tender, documents establishing the Tenderer's eligibility to Tender and its qualifications to perform the contract if its Tender is accepted.
- 13.2** In the event that pre-qualification of potential Tenderers has been undertaken, only Tenders from pre-qualified Tenderers will be considered for award of contract. These qualified Tenderers should submit their Tenders with any information updating the original pre-qualification applications or, alternatively, confirm in their Tenders that the originally submitted pre-qualification information remains essentially correct as of the date of Tender submission. The update or confirmation should be provided in Section IX.

13.3 If the Procuring Entity has not undertaken pre-qualification of potential Tenderers, to qualify for award of the contract, Tenderers shall meet the minimum qualifying criteria specified in the **Tender Data Sheet**:

13.4 Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements, unless otherwise stated in the **Tender Data Sheet**:

- a) The Tender shall include all the information listed in the **Tender Data Sheet** pursuant to sub-Clause 13.3 above for each joint venture partner;
- b) The Tender shall be signed so as to be legally binding on all partners;
- c) One of the partners will be nominated as being in charge, and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners;
- d) The partner in charge shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of a joint venture and the entire execution of the Contract, including payment, shall be done exclusively with the partner in charge;
- e) All partners of the joint venture shall be liable jointly and severally for the execution of the contract in accordance with the contract terms and a statement to this effect shall be included in the authorization mentioned under (c) above as well as in the Tender and in the Agreement (in case of a successful Tender); and
- f) A copy of the joint venture agreement entered into by all partner shall be submitted with the Tender. Alternatively, a Letter of Intent to execute a joint venture agreement in the event of a successful Tender shall be signed by all partners and submitted with the Tender, together with a copy of the proposed Agreement.
- g) The Tender Security and Tender Securing Declaration as stated in accordance with ITT Clause 19, and in case of a successful Tender, the Agreement, shall be signed so as to be legally binding on all partners.

14. Lots Package	14.1	When Tendering for more than one contract under the lots arrangements, the Tenderer must provide evidence that it meets or exceeds the sum of all the individual requirements for the lots being tendered in regard to: <ul style="list-style-type: none"> a) Average annual turnover; b) Particular experience including key production rates; c) Financial means, etc; d) Personnel capabilities; and e) Equipment capabilities.
	14.2	In case the Tenderer fail to fully meet any of these criteria, it may be qualified only for those lots for which the Tenderer meets the above requirement.
15. Form of Tender	15.1	The Tenderer shall fill the Form of Tender furnished in the Tendering Documents. The Form of Tender must be completed without any alterations to its format and no substitute shall be accepted.
16. Tender Prices	16.1	The Contract shall be for the whole Works, as described in sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Tenderer.
	16.2	The Tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the Tenderer will not be paid for by the Procuring Entity when executed and shall be deemed covered by the other rates and prices in the Bill of quantities.
	16.3	All duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 15 days prior to the deadline for submission of Tenders, shall be included in the rates, prices and total Tender price submitted by the Tenderer.
	16.4	The rates and prices quoted by the Tenderer shall be subject to adjustment during the performance of the Contract if provided for in the Tender Data Sheet and the provisions of the Conditions of Contract. The Tenderer shall submit with the Tender all the information required under the Contract Data Sheet .
17. Tender Currencies	17.1	The unit rates and prices shall be quoted by the Tenderer in the currency as specified in the TenderData Sheet .

	<p>17.2 Tenderers shall indicate details of their expected foreign currency requirements in the Tender, if any. The rates of exchange to be used by the Tenderers in arriving at the local currency equivalent shall be the selling rates for similar transactions established by the authority specified in the Tender Data Sheet prevailing on the date 28 days prior to the latest deadline for submission of Tenders. These exchange rates shall apply for all payments so that no exchange risk will be borne by the Tenderer. In any case, payments will be computed using the rates quoted in the Tender.</p>
	<p>17.3 Tenderers may be required by the Procuring Entity to clarify their foreign currency requirements and to substantiate that the amounts included in the rates and prices and in the Contract Data Sheet are reasonable and responsive to sub-Clause 17.1.</p>
<p>18. Tender Validity Period</p>	<p>18.1 Tenders shall remain valid for the period specified in the Tender Data Sheet after the Tender submission deadline prescribed by the Procuring Entity, pursuant to ITT Clause 22. A Tender valid for a shorter period shall be rejected by the Procuring Entity as non-responsive.</p> <p>18.2 In exceptional circumstances, prior to expiry of the original Tender validity period, the Procuring Entity may request that the Tenderers extend the period of validity for a specified additional period. The request and the Tenderers' responses shall be made in writing or by cable. A Tenderer may refuse the request without forfeiting its Tender Security or causing to be executed its Tender Securing declaration. A Tenderer agreeing to the request will not be required or permitted to otherwise modify the Tender, but will be required to extend the validity of its Tender Security or Tender Securing declaration for the period of the extension, and in compliance with ITT Clause 19 in all respects.</p> <p>18.3 In the case of fixed price contracts, if the award is delayed by a period exceeding sixty (60) days beyond the expiry of the initial Tender validity period, the contract price will be increased by a factor specified in the request for extension. The Tender evaluation shall be based on the Tender price without taking into consideration on the above correction.</p>
<p>19. Tender Security and Tender</p>	<p>19.1 Pursuant to ITT Clause 12, where required in the Tender Data Sheet, the Tenderer shall furnish as part of its Tender, a Tender Security in original form</p>

**Securing
Declaration**

and in the amount and currency specified in the **Tender Data Sheet**.

A Tender Securing Declaration as specified in the **Tender Data Sheet** in the format provided in section X shall be provided as a mandatory requirement.

- 19.2** The Tender Security or Tender Securing Declaration is required to protect the Procuring Entity against the risk of Tenderer's conduct which would warrant the security's forfeiture, pursuant to ITT sub-Clause 19.9.
- 19.3** The Tender Security shall be denominated in the currency of the Tender and shall be in one of the following forms:
- a) Cash;
 - b) A Bank Guarantee;
 - c) An Insurance Bond issued by an insurance firm approved by the PPRA located in Kenya;
 - d) An irrevocable letter of credit issued by a reputable bank.
- 19.4** The Tender Security shall be in accordance with the Form of the Tender Security included in Section X or another form approved by the Procuring Entity prior to the Tender submission.
- 19.5** The Tender Security shall be payable promptly upon written demand by the Procuring Entity in case any of the conditions listed in sub-Clause 19.8 are invoked.
- 19.6** Any Tender not accompanied by a Tender Security in accordance with sub-Clauses 19.1 or 19.3 shall be rejected by the Procuring Entity as non-responsive, pursuant to ITT Clause 28.
- 19.7** The Procuring Entity shall immediately release any Tender Security if:
- a) The procuring proceedings are terminated;
 - b) The Procuring Entity determines that none of the submitted Tenders is responsive;
 - c) A contract for the procurement is entered into.

19.8 The Tender Security shall be forfeited and the Tender Securing Declaration executed if the Tenderer:

- a) Withdraws its Tender after the deadline for submitting Tenders but before the expiry of the period during which Tenders must remain valid;
- b) Rejects a correction of an arithmetic error pursuant to sub-Clause 29.2;
- c) Refuse to enter into a written contract in accordance with ITT Clause 40;
- d) Fails to furnish the Performance Security in accordance with ITT Clause 41.

19.9 The Tender Security and Tender Securing Declaration of a joint venture must be in the name of the joint venture submitting the Tender.

19.10 A Tenderer shall be suspended from being eligible for Tendering in any contract with the Procuring Entity for the period of time indicated in the Tender Securing Declaration:

- a) If the Tenderer withdraws its Tender, except as provided in ITT sub-Clauses 18.2 and 29.2; or
- b) In the case of a successful Tenderer, if the Tenderer fails within the specified time limit to:
 - (i) Sign the contract; or
 - (ii) Furnish the required Performance Security.

20. Format and Signing of Tender

20.1 The Tenderer shall prepare one original of the documents comprising the Tender as described in ITT Clause 12 of these Instructions to Tenderers, with the Form of Tender, and clearly marked “**ORIGINAL**”. In addition, the Tenderer shall submit copies of the Tender, in the number specified in the **Tender Data Sheet**, and clearly marked as “**COPIES**”. In the event of discrepancy between them, the original shall prevail.

20.2 The original and all copies of the Tenders shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Tenderer. This authorization shall consist of a written confirmation as specified in the **Tender Data Sheet** and shall be attached to the Tender. The name and position held by each person

signing the authorization must be typed or printed below the signature. All pages of the Tender, except for un-amended printed literature, shall be initialled by the person or persons signing the Tender.

20.3 Any interlineations, erasures, or overwriting shall be valid only if they are initialled by the person or persons signing the Tender.

20.4 The Tenderer shall furnish information as described in the Form of Tender on commissions or gratuities, if any, paid or to be paid to agents relating to this Tender and to contract execution if the Tenderer is awarded the contract

D. Submission of Tenders

21. Sealing and Marking of Tenders

21.1 The Tenderer shall seal the original and each copy of the Tender in separate envelopes, duly marking the envelopes as “**ORIGINAL**” and “**COPY**”. The envelopes shall then be sealed in an outer envelope securely sealed in such a manner that opening and resealing cannot be achieved undetected.

21.2 The inner and outer envelopes shall:

- a) Be addressed to the Procuring Entity at the address given in the **Tender Data Sheet**; and
- b) Bear the Project name indicated in the **Tender Data Sheet**, the Invitation for Tenders (IFB) title and number indicated in the **Tender Data Sheet**, and a statement: “**DO NOT OPEN BEFORE,**” to be completed with the time and the date specified in the **Tender Data Sheet**, pursuant to ITT sub-Clause 22.1.

21.3 In addition to the identification required in sub-Clause 21.2, the inner envelopes shall also indicate the name and address of the Tenderer to enable the Tender be returned unopened in case it is declared late, pursuant to sub-Clause 22.1 and for matching purpose under ITT Clause 23

21.4 If the outer envelope is not sealed and marked as required by ITT sub clause 21.2, the Procuring Entity shall assume no responsibility for misplacement or premature opening of the Tender.

22. Deadline for Submission of Tenders

22.1 Tenders shall be received by the Procuring Entity at the address specified under ITT sub-Clause 21.2 no later

than the date and time specified in the **Tender Data Sheet**.

22.2 The Procuring Entity may, in exceptional circumstances and at its discretion, extend the deadline for the submission of Tenders by amending the Tendering documents in accordance with ITT Clause 9, in which case all rights and obligations of the Procuring Entity and Tenderers previously subject to the deadline will thereafter be subject to the new deadline.

22.3 The extension of the deadline for submission of Tenders shall not be made later than the period specified in the **Tender Data Sheet** before the expiry of the original deadline.

23. Late Tenders

23.1 The Procuring Entity shall not consider for evaluation any Tender that arrives after the deadline for submission of Tenders, in accordance with ITT Clause 22.

23.2 Any Tender received by the Procuring Entity after the deadline for submission of Tenders shall be declared late, rejected and returned unopened to the Tenderer

24. Modification, Substitution and Withdrawal of Tenders

24.1 A Tenderer may modify or substitute or withdraw its Tender after it has been submitted, provided that written notice of the modification, including substitution or withdrawal of the Tender, is received by the Procuring Entity prior to the deadline prescribed for submission of Tenders prescribed under ITT sub-Clause 22.1.

24.2 The Tenderer's modification or substitution or withdrawal notice shall be prepared, sealed, marked, and dispatched in accordance with the provisions of ITT Clauses 20 and 21 with the outer and inner envelopes additionally marked "**MODIFICATION**" or "**SUBSTITUTION**" or "**WITHDRAWAL**" as appropriate. The notice may also be sent by electronic mail and facsimile, but followed by a signed confirmation copy, postmarked not later than the deadline for submission of Tenders.

24.3 No Tender may be withdrawn, replaced or modified in the interval between the deadline for submission of Tenders and the expiration of the period of Tender validity specified by the Tenderer on the Tender Form. Withdrawal of a Tender during this interval shall result in the Tenderer's forfeiture of its Tender Security or execution of Tender Securing Declaration, pursuant to the ITT sub-Clause 19.9.

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- 24.4** Withdrawal of a Tender between the deadline for submission of Tenders and the expiration of the period of Tender validity specified in the **Tender Data Sheet** or as extended pursuant to sub-Clause 22.2 shall result in the forfeiture of the Tender Security and execution of Tender Securing Declaration pursuant to ITT sub-Clause 19.9.
- 24.5** Tenderers may only offer discounts to, or otherwise modify the prices of their Tenders by submitting Tender modifications in accordance with this Clause, or included in the original Tender submission.

E. Opening and Evaluation of Tenders

25. Opening of Tenders

- 25.1** The Procuring Entity will open all Tenders including modifications, substitution or withdraw notices made pursuant to ITT Clause 24, in public, in the presence of Tenderers or their representatives who choose to attend and other parties with legitimate interest and Tender proceedings, at the place on the date and at time specified in the **Tender Data Sheet**. The Tenderers' representatives who are present shall sign a register as proof of their attendance.
- 25.2** Envelopes marked "**WITHDRAWAL**" shall be opened and read out first. Tenders for which an acceptable notice of withdrawal has been submitted pursuant to ITT Clause 24 shall not be opened but returned to the Tenderer. If the withdrawal envelope does not contain a copy of the "Power of Attorney" confirming the signature as a person duly authorized to sign on behalf of the Tenderer, the corresponding Tender will be opened. Subsequently, all envelopes marked "**MODIFICATION**" shall be opened and the submissions therein read out in appropriate detail. Thereafter all envelopes marked or "**SUBSTITUTION**" opened and the submissions therein read out in appropriate detail.
- 25.3** All other envelopes shall be opened one at a time. The Tenderers' names, the Tender prices, the total amount of each Tender and of any alternative Tender (if alternatives have been requested or permitted), any discounts, the presence or absence of Tender security, and such other details as the appropriate tender opening committee may consider appropriate, will be announced by the Secretary of the Tender Opening Committee at the opening.
- 25.4** Tenders or modifications that are not opened and not read out at Tender opening shall not be considered further for evaluation, irrespective of the circumstances.

In particular, any discount offered by a Tenderer which is not read out at Tender opening shall not be considered further.

- 25.5** Tenderers are advised to send in a representative with the knowledge of the content of the Tender who shall verify the information read out from the submitted documents. Failure to send a representative or to point out any un-read information by the sent Tenderer's representative shall indemnify the Procuring Entity against any claim or failure to read out the correct information contained in the Tenderer's Tender.
- 25.6** No Tender will be rejected at Tender opening except for late Tenders which will be returned unopened to the Tenderer, pursuant to ITT Clause 23.
- 25.7** The Secretary of the appropriate tender opening committee shall prepare minutes of the Tender opening. The record of the Tender opening shall include, as a minimum: the name of the Tenderers and whether or not there is a withdrawal, substitution or modification, the Tender price per Lot if applicable, including any discounts and alternative offers and the presence or absence of a Tender Security or Tender Securing Declaration.
- 25.8** The Tenderers' representatives who are present shall be requested to sign the record. The omission of a Tenderer's signature on the record shall not invalidate the contents and affect the record.
- 25.9** A copy of the minutes of the Tender opening shall be furnished to individual Tenderers upon request.

26. Confidentiality

- 26.1** Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a Contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced.
- 26.2** Any effort by a Tenderer to influence the Procuring Entity's processing of Tenders or award decisions may result in the rejection of his Tender.
- 26.3** Notwithstanding sub-Clause 26.2, from the time of Tender opening to the time of Contract award, if any Tenderer wishes to contact the Procuring Entity on any matter related to the Tendering process, it should do so in writing.

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- 27. Clarification of Tenders**
- 27.1** To assist in the examination, evaluation, comparison of Tenders and post-qualification of the Tenderer, the Procuring Entity may, at its discretion, ask a Tenderer for clarification of its Tender including breakdown of prices. Any clarification submitted by a Tenderer that is not in response to a request by the Procuring Entity shall not be considered.
- 27.2** The request for clarification and the response shall be in writing. No change in the prices or substance of the Tender shall be sought, offered, or permitted except to confirm the correction of arithmetic errors discovered by the Procuring Entity in the evaluation of Tenders in accordance with ITT Clause 29.
- 27.3** From the time of Tender opening to the time of Contract award if any Tenderer wishes to contact the Procuring Entity on any matter related to the Tender it should do so in writing.
- 28. Preliminary Examination of Tenders**
- 28.1** Prior to the detailed evaluation of Tenders, the Procuring Entity will determine whether:
- a) The Tender has been submitted in the required format;
 - b) Any Tender Security submitted is in the required form, amount and validity period;
 - c) The Tender has been signed by the person lawfully authorized to do so;
 - d) The required number of copies of the Tender have been submitted;
 - e) The Tender is valid for the period required;
 - f) All required documents and information have been submitted; and
 - g) Any required samples have been submitted.
- 28.2** The Procuring Entity will confirm that the documents and information specified under ITT Clause 12 and ITT Clause 13 have been provided in the Tender. If any of these documents or information is missing, or is not provided in accordance with the Instructions to Tenderers, the Tender shall be rejected.
- 28.3** The Procuring Entity may waive any minor informality, nonconformity, or irregularity in a Tender which does not constitute a material deviation, provided such waiver

does not prejudice or affect the relative ranking of any Tenderer

28.4 A substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tendering documents, without material deviation or reservation. A material deviation or reservation is one that:

- a) Affects in any substantial way the scope, quality, or execution of the Works;
- b) Limits in any substantial way, inconsistent with the Tendering documents, the Procuring Entity's rights or the Tenderer's obligations under the Contract; or
- c) If rectified, would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders.

28.5 If a Tender is not substantially responsive, it will be rejected by the Procuring Entity, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

29. Correction of Errors

29.1 Tenders determined to be substantially responsive will be checked by the Procuring Entity for any arithmetic errors. Errors will be corrected by the Procuring Entity as follows:

- a) If there is a discrepancy between unit prices and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected, unless in the opinion of the Procuring Entity there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected;
- b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- c) Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.

29.2 The amount stated in the Tender will, be adjusted by the Procuring Entity in accordance with the above procedure for the correction of errors and, with, the concurrence of the Tenderer, shall be considered as binding upon the

	<p>Tenderer. If the Tenderer does not accept the corrected amount, its Tender will then be rejected, and the Tender Security may be forfeited and the Tender Securing Declaration may be executed in accordance with sub-Clause 19.9.</p>
<p>30. Conversion to Single Currency</p>	<p>30.1 To facilitate the evaluation and comparison, the Procuring Entity will convert all Tender prices expressed in the amounts in various currencies in which the Tender prices are payable to Kenya Shillings at the selling exchange rate established for similar transactions by the Central Bank of Kenya ruling on the date specified in the Tender Data Sheet.</p>
<p>31. Comparison of Tenders</p>	<p>31.1 The Procuring Entity shall evaluate and compare only the Tenders determined to be substantially responsive in accordance with ITT Clause 28.</p> <p>31.2 In evaluating the Tenders, the Procuring Entity will determine for each Tender the evaluated Tender price by adjusting the Tender price as follows: Making any correction for errors pursuant to ITT Clause 29; Excluding provisional sums and the provision, if any for contingencies in the Bill of Quantities, but including Day work , where priced competitively ; and Making appropriate adjustments to reflect discounts or other price modifications offered in accordance with sub-Clause 24.5.</p> <p>31.3 The Procuring Entity may waive any minor informality or non-conformity, which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative standing of any Tenderer. Variations, deviations, and alternative offers and other factors, which are in excess of the requirements of the Tendering documents or otherwise result in unsolicited benefits for the Procuring Entity will not be taken into account in Tender evaluation.</p>
<p>32. National Preference</p>	<p>32.1 In the evaluation of Tenders the Procuring Entity shall apply exclusive preference to citizens of Kenya where:</p> <p>a) The funding is 100% from the Government of Kenya or a Kenyan body;</p> <p>b) The amounts are below the prescribed threshold of KShs.200 million;</p> <p>32.2 To qualify for the preference the candidate shall provide evidence of eligibility by:</p>

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- a) Proving Kenyan citizenship by production of a Kenyan Identity Card; or
- b) Providing proof of being a “citizen contractor” in terms of section 3(1) of the Act, i.e. being a natural person or an incorporated company wholly owned and controlled by persons who are citizens of Kenya.
- 32.3** The Minister of Finance may prescribe additional preference and/or reservation schemes, for example for procurements above these thresholds. If such additional preference schemes apply, details will be given in the **Tender Data Sheet**.
- 33. Determination of the Lowest Evaluated Tender** **33.1** The Tender with the lowest evaluated price from among those which are eligible, compliant and substantially responsive shall be the lowest evaluated Tender.
- 34. Post-qualification of Tenderer** **34.1** If specified in the **Tender Data Sheet**, post-qualification shall be undertaken.
- 34.2** The Procuring Entity will determine to its satisfaction whether the Tenderer that is selected as having submitted the lowest evaluated responsive Tender is qualified to perform the contract satisfactorily, in accordance with the criteria listed in sub-Clause 13.3.
- 34.3** The determination will take into account the Tenderer’s financial, technical, and production capabilities. It will be based upon an examination of the documentary evidence of the Tenderer’s qualifications submitted by the Tenderer, pursuant to sub-Clause 13.3, as well as such other information as the Procuring Entity deems necessary and appropriate. Factors not included in these Tendering documents shall not be used in the evaluation of the Tenderer’s qualifications.
- 34.4** An affirmative determination will be a prerequisite for award of the contract to the Tenderer. A negative determination will result in rejection of the Tenderer’s Tender, in which event the Procuring Entity will proceed to the next lowest evaluated Tender to make a similar determination of that Tenderer’s capabilities to perform satisfactorily.

F. Award of Contract

- 35. Criteria of Award** **35.1** Subject to ITT Clause 35 and 36, the Procuring Entity will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tendering documents and who has offered the lowest

Evaluated Tender Price, provided that such Tenderer has been determined to be:

- a) Eligible in accordance with the provisions of ITT Clause 3;
- b) Is determined to be qualified to perform the Contract satisfactorily;
- c) Successful negotiations have been concluded.

35.2 If, pursuant to sub-Clause 14.1, this Contract is being awarded on a “lot and package” basis, the lowest evaluated Tender price will be determined when evaluating this Contract in conjunction with other Contracts to be awarded concurrently, taking into account any discounts offered by the Tenderer for award of more than one Contract.

36. Clarifications

36.1 Clarifications may be undertaken with the lowest evaluated Tenderer relating to the following areas:

- a) A minor alteration to the technical details of the statement of requirements;
- b) Reduction of quantities for budgetary reasons, where the reduction is in excess of any provided for in the Tendering documents;
- c) A minor amendment to the Contract Data Sheet;
- d) Finalizing payment arrangements;
- e) Mobilization arrangements;
- f) Agreeing final delivery or work schedule to accommodate any changes required by the Procuring Entity;
- g) The methodology or staffing; or
- h) Clarifying details that were not apparent or could not be finalized at the time of Tendering.

36.2 Clarifications shall not change the substance of the tender.

37. Procuring Entity’s Right to Accept any

37.1 Notwithstanding ITT Clause 35, the Procuring Entity reserves the right to accept or reject any

Tender and to Reject any or all Tenders	Tender, and to cancel the Tendering process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers.
	37.2 Notice of the rejection of all Tenders shall be given promptly within 14 days to all Contractors that have submitted Tenders.
	37.3 The Procuring Entity shall upon request communicate to any Tenderer the grounds for its rejection of its Tenders, but is not required to justify those grounds.
38. Procuring Entities Right to Vary Quantities at the Time of Award	38.1 The Procuring Entity reserves the right at the time of contract award to increase or decrease the quantity of goods or related services originally specified in these Tendering documents (schedule of requirements) provided this does not exceed by the percentage indicated in the Tender Data Sheet , without any change in unit price or other terms and conditions of the Tender and Tendering documents.
39. Notification of Award	39.1 The Tenderer whose Tender has been accepted will be notified of the award by the Procuring Entity prior to expiration of the Tender validity period by e-mail or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Procuring Entity will pay the Contractor in consideration of the provision and maintenance of the Work(s) as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").
	39.2 The notification of award will constitute the formation of the Contract, subject to the Tenderer furnishing the Performance Security in accordance with ITT Clause 41 and signing the Contract in accordance with sub-Clause 40.2
	39.3 At the same time as the person submitting the successful Tender is notified, the Procuring Entity will notify each unsuccessful Tenderer, the name of the successful Tenderer and the Contract amount and will discharge the Tender Security and Tender Securing Declaration of the Tenderer pursuant to ITT sub Clause 19.7.

39.4 If, after notification of award, a Tenderer wishes to ascertain the grounds on which its Tender or application for pre-qualification was unsuccessful, it should address its request to the secretary of the Tender Committee that authorized the award of contract. The secretary of the Tender Committee shall, within fourteen days after a request, provide written reasons as to why the Tender, proposal or application to be pre-qualified was unsuccessful. However, failure to take this opportunity to clarify the grounds for rejection does not affect the Tenderer's right to seek immediate review by the Public Procurement Administrative Review Board under Clause 45.

40. Signing of Contract

40.1 Promptly, and in no case later than 14 days, after notification, Procuring Entity shall send the successful Tenderer the Agreement and Contract Data Sheet, incorporating all agreements between the parties obtained as a result of Contract negotiations.

40.2 Within the period specified in the notification or Tender Data Sheet but not earlier than fourteen (14) days since notification of award of contract, the successful Tenderer shall sign and date the contract and return it to the Procuring Entity.

41. Performance Security

41.1 Within thirty (30) days but after 14 days after receipt of the Letter of Acceptance, the successful Tenderer shall deliver to the Procuring Entity a Performance Security in the amount and in the form stipulated in the Tender Data Sheet and the Contract Data Sheet, denominated in the type and proportions of currencies in the Letter of Acceptance and in accordance with the Conditions of Contract.

41.2 If the Performance Security is provided by the successful Tenderer in the form of a Bank Guarantee or Insurance Bond, it shall be issued either:

- a) At the Tenderer's option, by a bank or insurance firm located in Kenya, or a foreign bank or insurance firm through a correspondent bank or insurance firm located in Kenya;

b) With the consent of the Procuring entity, directly by a foreign bank acceptable to the Procuring entity.

41.3 Failure of the successful Tenderer to comply with the requirement of sub-Clause 41.1 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Tender Security, in which event the Procuring Entity may make the award to the next lowest evaluated Tenderer or call for new Tenders.

42. Advance Payment

42.1 The Procuring Entity will provide an Advance Payment as stipulated in the Conditions of Contract, subject to a maximum amount, as stated in the Tender Data Sheet.

42.2 The Advance Payment request shall be accompanied by an Advance Payment Security (Guarantee) in the form provided in Section X. For the purpose of receiving the Advance Payment, the Tenderer shall make an estimate of, and include in its Tender, the expenses that will be incurred in order to commence work. These expenses will relate to the purchase of equipment, machinery, materials, and on the engagement of labour during the first month beginning with the date of the Procuring Entity's "Notice to Commence" as specified in the Contract Data Sheet.

43. Adjudicator

43.1 The Procuring Entity proposes the person named in the Tender Data Sheet to be appointed as Adjudicator under the Contract, at an hourly fee specified in the Tender Data Sheet, plus reimbursable expenses. If the Tenderer disagrees with this proposal, the Tenderer should so state in the Tender. If, in the Letter of Acceptance, the Procuring Entity has not agreed on the appointment of the Adjudicator, the Adjudicator shall be appointed by the Appointing Authority designated in the Contract Data Sheet at the request of either party.

G. Review of Procurement Decisions

44. Right to Review

44.1 A Tenderer who claims to have suffered or risk suffering, loss or damage or injury as a result of breach of a duty imposed on a Procuring Entity or an Approving Authority by the Public Procurement and Disposal Act, 2005 and the Public Procurement

and Disposal Regulations 2006, the procurement proceedings or processes, may seek administrative review as prescribed by the Act. The following matters, however, shall not be subject to the administrative review:

- a) The choice of procurement method;
- b) a decision by the Procuring Entity to reject all Tenders, proposals or quotations;
- c) Where a contract is signed in accordance to Section 68 of the Public Procurement and Disposal Act,2005;
- d) Where an appeal is frivolous.

45. Time Limit on Review **45.1** The Tenderer shall submit an application for review in the number of copies and pay fees as prescribed by the Public Procurement and Disposal Regulations 2006 within fourteen (14) days of the time the Tenderer became or should have become aware of the circumstances giving rise to the complaint or dispute.

46. Submission of Applications for Review by the Public Procurement Administrative Review Board

46.1 Any application for administrative review shall be submitted in writing to the Secretary, Public Procurement Administrative Review Board on Form RB 1 at the address shown in the Tender Data Sheet. The secretary to the review board shall immediately after filing of the request, serve a copy thereof on the Procuring Entity or Director-General as the case may be.

46.2 The application for administrative review shall be in accordance with the requirements of Regulation 73 of the Public Procurement and Disposals Regulations,2006, including:

- a) Reasons for the complaint ,including any alleged breach of the Act or Regulations;
- b) An explanation of how the provisions of the Act and or Regulation has been breached or omitted, including the dates and name of the responsible public officer, where known;
- c) Statements or other evidence supporting the complaint where available as the applicant considers necessary in support of its request;
- d) Remedies sought;

e) Any other information relevant to the complaint.

47. Decision by the Public Procurement Administrative Review Board

- 47.1** The Administrative Review Board shall within thirty days after receipt of an application for administrative review deliver a written decision which shall indicate:
- a) Annulling anything the Procuring Entity has done in the procurement proceedings, including annulling the procurement proceedings in their entirety;
 - b) Giving directions to the Procuring Entity with respect to anything to be done or redone in the procurement proceedings;
 - c) Substituting the decision of the Review Board for any decision of the Procuring Entity in the procurement proceedings;
 - d) Order the payment of costs as between parties to the review.

47.2 The decision made by the Review Board shall, be final and binding on the parties unless judicial review thereof commences within fourteen (14) days from the date of the Review Board's decision.

48. Appeal on the decision of the Review Board

48.1 Any party to the review aggrieved by the decision of the Review Board may appeal to the High Court and the decision of the High Court shall be final.

SECTION III: TENDER DATA SHEET

Tender Data Sheet (TDS)

Instructions to Tenderers Clause Reference

TDS Reference Number	ITT Clause Number	Amendments of, and Supplements to, Clauses in the Instruction to Tenderers
A. Introduction		
1.	1.1	The Procuring Entity is Central Rift Valley Water Works Development Agency
2.	1.1	Name of Project is Drilling, Equipping and Civil Works for Aboretum Borehole Water Project in Nyandarua County
3.	1.2	The expected completion date of the works is 90 Days after the commencement Date
4.	1.3	The Objectives of the Project are to increase water coverage in Ol Kalou town and Environs
5.	2.1	Name of financing institution is Government of Kenya Name of the Procuring entity is Central Rift Valley Water Works Development Agency Financial Year : 2020/2021 Describe works under the contract <ul style="list-style-type: none"> • Drilling of 1No 8” Ø borehole 200m deep • Pumping System & Solar Equipment with a submersible pump Provisional Sum of Kshs.3,000,000 • Construction of 1No 24m³ steel tank on 18m high Steel Tower • Construction of Water Kiosk • Fencing of Borehole Site 200m and Steel Gate • Installation of Token system for water purchase
6.	2.2	The loan/ credit number Is N/A
7.	5.1	Alternative Tenders are “not allowed “ in this Tender.
8.	5.2	Alternative time for completion N/A
9.	3.1	Only Tenderers registered as Registered under class 7 and above in Civil/Water Works with the National Construction Authority
10.	7.3	Pre-Tender site visit and meeting will take place N/A

11.	7.5	The minutes of the pre-Tender meeting will be transmitted within N/A
	7.6	Non-attendance at the pre-tender visit and meeting N/A

B. Tendering Documents		
12.	8.2	The number of copies to be completed and returned with the Tender is two copies : 1 original and 1 copy
13.	8.1	Address for clarification of Tendering Document is Chief Executive Officer, Central Rift Valley Water Works Development Agency P.O BOX 2451 Nakuru, located, Maji plaza, prisons road, Off Eldama Ravine Road,
14.	8.2	Period to Respond to request for clarification by the Procuring Entity 4 days before deadline for submission of Tenders Period Prior to deadline for submission of Tenders for Tenderers to request clarification 7 days

C. Preparation of Tenders																													
15.	11.1	Language of Tender and all correspondence shall be English																											
16.	13.3	<p>Evaluation and comparison of Tenders: The following evaluation criteria shall be applied not withstanding any other requirement in the tender documents.</p> <p><i>a) Eligibility Criteria (EC)</i></p> <p>The following requirements must be met by the tenderer</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Requirements</th> <th>Responsive/Non Responsive</th> </tr> </thead> <tbody> <tr> <td>EC1</td> <td>Must Submit a copy of certificate of Registration/Incorporation</td> <td></td> </tr> <tr> <td>EC2</td> <td>Must Submit a copy of Valid Tax Compliance certificate</td> <td></td> </tr> <tr> <td>EC3</td> <td>Registered with the National Construction Authority category 7 and above , Civil /Water works class</td> <td></td> </tr> <tr> <td>EC4</td> <td>Signatory has authorized power of attorney for Joint Ventures</td> <td></td> </tr> <tr> <td>EC5</td> <td>Must Fill the Bill of Quantities in the Format provided</td> <td></td> </tr> <tr> <td>EC6</td> <td>Must Fill the Form of Tender in the Format provided</td> <td></td> </tr> <tr> <td>EC7</td> <td>Must submit a Tender Security in the format provided (Kshs.170,000)</td> <td></td> </tr> <tr> <td>EC8</td> <td>Duly serialized tender document (Every page of the bid document must be serialized)</td> <td></td> </tr> </tbody> </table>	No.	Requirements	Responsive/Non Responsive	EC1	Must Submit a copy of certificate of Registration/Incorporation		EC2	Must Submit a copy of Valid Tax Compliance certificate		EC3	Registered with the National Construction Authority category 7 and above , Civil /Water works class		EC4	Signatory has authorized power of attorney for Joint Ventures		EC5	Must Fill the Bill of Quantities in the Format provided		EC6	Must Fill the Form of Tender in the Format provided		EC7	Must submit a Tender Security in the format provided (Kshs.170,000)		EC8	Duly serialized tender document (Every page of the bid document must be serialized)	
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		<i>EC9</i>	Must submit a dully filled, signed and stamped Confidential Business Questionnaire in format provided	
At this stage, the tenderer's submission will either be responsive or non-responsive. The non-responsive submissions will be eliminated from the entire evaluation process and will not be considered further.				
17.	13.4	<i>b) Qualification Criteria (QC)</i>		
		No.	Evaluation Attribute	Compliance Requirements
		History of Nonperforming Contracts	Non-performance of a contract did not occur within the last three (3) years prior to the deadline for application submission based on all information on fully settled disputes or litigation. A fully settled dispute or litigation is one that has been resolved in accordance with the Dispute Resolution Mechanism under the respective contract, and where all appeal instances available to the applicant have been exhausted	Must Meet requirement Litigation History
		Key Personnel (Attach evidence)	(i) Site Agent;1No At least diploma in a civil/water engineering or equivalent. with 10 years relevant experience	Must Meet requirement Standard Form C (With attachments)
			(ii) Foreman;1No At least Certificate in building, masonry or equivalent. with 5 years relevant experience	Must Meet requirement Standard Form C (With attachments)
			(iii) Driller At least Diploma in Water Engineering/Hydrogeology/Geology/Ground Water or equivalent with 5 years drilling experience in different formation	Must Meet requirement Standard Form C (With attachments)
			(iv)Electrician At least Diploma in Electrical with 5 years relevant experience	Must Meet requirement Standard Form C (With attachments)
			(v) Mason; 1 No At least trade test grade III in Mason or equivalent with 5 years' experience	Must Meet requirement Standard Form C (With attachments)
		General Construction Experience	Experience under construction contracts in the role of contractor, subcontractor, or management contractor for at least the last Three (3) years for works above Kshs. 10M [Ten Million] prior to the applications submission deadline	Must Meet requirement Standard Form C (With attachments)
		Specific Experience	At least 1No Project of similar nature, complexity and Magnitude completed in the last Three (3) years where firm was prime contractor.	Must Meet requirement Standard Form C (With attachments)

		Current Commitments	Not more than 2 No. ongoing projects of similar nature, complexity and magnitude whose contract period extends beyond 15 th January, 2021, unless if the firm can demonstrate liquidity and sufficient working capital to carry-out the same	Must Meet requirement	Standard Form C (With attachments)
		Equipment Holdings	Schedules of contractor's equipment and transport (proof of evidence of ownership, lease or hiring) <ul style="list-style-type: none"> • Drilling Rig capable of drilling up to 300m depth complete with accessories • Test-pumping unit • Lorry truck • Concrete mixer • Poker Vibrator 	Must Meet requirement	Standard Form C (With attachments) <ul style="list-style-type: none"> • Certified copy of Log books • Lease agreement with ownership documents of lessor attached
		Historical Financial Performance	Audited financial reports(issued by a licensed Public Accountant with valid practising license for 2020) for the last three (3) years to demonstrate the current soundness of the bidder's financial position and its prospective long-term profitability.	Must Meet requirement	Standard Form C (With attachments)
		Average Annual Turnover	Average Annual Turnover (AAT) for the last three years of Kshs 15 million	Must Meet requirement	Standard Form C (With attachments)
		Financial Resources	Evidence of Financial Resources (cash in hand, lines of credit, over draft facility, etc.) Has financial resources equal or above the cost of the project (as per the bid sum)	Must Meet requirement	Standard Form C (With attachments) Letters from banks affirming availability of credit facilities should be dully signed and stamped by the authorised officers.
		Only bidders who qualify at this stage will be subjected to the award criteria. Financial comparison which will be in accordance to Section 82, PPADA 2015			
18.	16.4	The price shall be Fixed Information to be submitted with the Tender are: (state if any).			
19.	17.1	The currency in which the prices shall be quoted shall be: Kenyan Shilling			

20.	17.2 30.2	The authority for establishing the rates of exchange shall be Central Bank of Kenya. The applicable date for exchange rates for tendering and evaluation purposes is 28 days earlier than the final deadline for the submission of tenders.
21.	18.1	The Tender validity period shall be 120 days.
22.	19.1	The amount of Tender Security shall be (Kshs.170,000)
23.	20.1	In addition to the original of the Tender, the Tenderer should submit one copy of the Tender
24.	20.2	Written confirmation of authorization N/A

D. Submission of Tenders

25.	21.2 a)	Tenders shall be submitted to: Chief Executive Officer, Central Rift Valley Water Works Development Agency: Street Address: Prisons Road off Eldama Ravine Road Building/Plot No. Maji Plaza Floor/Room No. Boardroom City/Town. Nakuru
26.	21.2 b)	Project name Drilling, Equipping and Civil Works for Aboretum Borehole Water Project in Nyandarua County Tender number CRVWWDA/NYA/OBWSP/ABORETUM/2020-2021 Time and date for submission: 18th November,2020 at ,12.00 noon
27.	22.1	The deadline for Tender submission is a) Day: Wednesday b) Date: 18th November,2020 c) Time 12.00 Noon.
28.	22.3	The extension of the deadline for submission of Tenders shall be made not later than 3 days before the expiry of the original deadline.
29	24.4	Expiry of Tender validity is 120 Days after Tender Submission Date

E. Opening and Evaluation of Tenders

29.	25.1	The Tender opening shall take place at: The Central Rift Valley Water Works Development Agency offices Building/Plot No. Maji Plaza Floor/Room No. Boardroom City/Town: Nakuru Country: Kenya Date. 18th November, 2020 Time12.05 Noon.
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30.	32.3	Additional Preference-----N/A-----
31.	34.1	Post- qualification will be undertaken
32.	38.1	Percentage for quantities increase or decrease should not exceed 15 percent
F. Award of Contract		
33.	41.1	The amount of Performance Security shall be 10% of the contract price
34.	42.1	The Advance Payment shall be N/A
35.	43.1	The proposed adjudicator for the project is: Chairman IEK
G. Review of Procurement Decisions		
37.	46.1	The address for submitting appeals to Administrative Review Board : The Secretary, Public Procurement Administrative Review Board , The Public Procurement Regulatory Authority, 10 th Floor ,National Bank House, P.O. Box 58583-00200, NAIROBI, Kenya. Tel: +254 (0) 20 3244000 Email: info@ppra.go.ke Website: www.ppra.go.ke

SECTION IV: GENERAL CONDITIONS OF CONTRACT

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A. General

1. Definitions

1.1 Boldface type is used to identify defined terms.

The **Adjudicator** is the person appointed jointly by the Procuring Entity and the Contractor to resolve disputes in the first instance, as provided for in Clauses 27 and 28 hereunder.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Tender.

Compensation Events are those defined in Clause 47 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with Sub-Clause 58.1.

The **Contract** is the Contract between the Procuring Entity and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in Clause 2.3 below.

The **Contractor** is a person or corporate body whose Tender to carry out the Works has been accepted by the Procuring Entity.

The **Contractor's Tender** is the completed Tendering document submitted by the Contractor to the Procuring Entity.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; months are calendar months.

Dayworks are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects Liability Certificate** is the certificate issued by the Project Manager upon correction of defects by the Contractor.

The **Defects Liability Period** is the period named in the **Contract Data Sheet** and calculated from the Completion Date.

Drawings include calculations and other information provided or approved by the Project Manager for the execution of the Contract.

The **Procuring Entity** is the party who employs the Contractor to carry out the Works.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the Procuring Entity's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the **Contract Data**

Sheet. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.

Materials are all supplies, including consumables, used by the Contractor for incorporation in the Works.

Plant is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.

The **Project Manager** is the person named in the **Contract Data Sheet** (or any other competent person appointed by the Procuring Entity and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract and shall be an “Architect” or a “Quantity Surveyor” registered under the Architects and Quantity Surveyors Act Cap 525 or an “Engineer” registered under Engineers Registration Act Cap 530.

The **Site** is the area defined as such in the **Contract Data Sheet**.

Site Investigation Reports are those that were included in the Tendering documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

The **Start Date** is given in the **Contract Data Sheet**. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.

Temporary Works are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.

A **Variation** is an instruction given by the Project Manager that varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Procuring Entity, as defined in the **Contract Data Sheet**.

“**Force Majeure**” means an event which is beyond the reasonable control of a Party and which makes a Party’s performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances.

2. Interpretation

- 2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way round. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager will provide instructions clarifying queries about these Conditions of Contract.

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- 2.2 If sectional completion is specified in the **Contract Data Sheet**, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).
- 2.3 The documents forming the Contract shall be interpreted in the order of priority given in the **Contract Data Sheet**:
- (1) Agreement;
 - (2) Letter of Acceptance;
 - (3) Contract Data Sheet;
 - (4) Conditions of Contract;
 - (5) Technical Specifications;
 - (6) Contractor's Tender;
 - (7) Drawings;
 - (8) Bill of Quantities; and
 - (9) Any other document listed in the **Contract Data Sheet** as forming part of the Contract.

3. Language, Law, Fraud and Corruption

- 3.1 The language of the Contract and the law governing the Contract are stated in the **Contract Data Sheet**.
- 3.2 The Government requires that Procuring Entities (including beneficiaries of Government funded projects) as well as Tenderers/Suppliers/Contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. It is the responsibility of the Procuring Entity to ensure that Tenderers, suppliers, and contractors and their subcontractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy:

For the purpose of this provision, the following definitions are provided:

- (i). **“Corruption”** has the meaning assigned to it in the Anti Corruption and Economic Crime Act 2003 and includes the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement or disposal process or in contract execution;
- (ii). **“Fraudulent Practice”** includes a misrepresentation of fact in order to influence a procurement or disposal process or the execution of a contract to the detriment of the Procuring Entity and includes collusive practices amongst Tenderers prior to or after Tender submission designed to establish Tender prices at artificial non competitive levels and deprive the Procuring Entity of the benefits of free and open competition;

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- (iii). **“Collusive Practice”** means an arrangement between two or more suppliers, contractors and subcontractors designed to achieve an improper purpose, including to influence improperly the actions of the Procuring Entity prior to or after Tender submission, designed to establish Tender prices at artificial non competitive levels and to deprive the Procuring Entity of the benefit of free and open competition;
 - (iv). **“Coercive Practice”** means impairing or harming, or threatening to impair or harm, directly or indirectly a supplier, contractor or subcontractor or the property of any of them to influence improperly the actions of a Procuring Entity;
 - (v). **“Obstructive Practice”** means deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede an investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and /or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation.

A Procuring Entity has the right to require that Tenderers, suppliers, and contractors and their subcontractors permit persons duly appointed by KACC/PPRA/KNAO to inspect their accounts and records and other documents relating to the Tender submission and contract performance;

The Procuring Entity will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt, fraudulent practices or others stated under Clause 44.1.a in competing for the contract;

In pursuit of the policy defined in sub-Clause 44.1 the Procuring Entity will cancel the portion of the funds allocated to a contract for goods, works, or services if it at any time determines that corrupt or fraudulent practices were engaged in by representatives of the Procuring Entity or Approving Authority or of a beneficiary of the funds during the procurement or the execution of that contract;

In the event that the Procuring Entity or Approving Authority does not take timely and appropriate action satisfactory to the Government of Kenya to remedy the situation, then the Director-General may order an investigation of procurement proceedings for the purpose of determining whether there has been a breach of the Public Procurement and Disposal Act, 2005.

3.3 The Director-General may, on the advice of the Advisory Board, debar a person from participating in procurement proceedings on the ground that the person has committed an offence under the Public Procurement and Disposal Act, 2005. A debarment shall be for a period of time of not less than five years. Before a person is so debarred, he/she will be given an opportunity to

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- make representations to the Director-General and may request the Review Board to review the debarment.
- 3.4 Any communication between the Tenderers and the Procuring Entity related to matters of alleged fraud or corruption must be made in writing.
- 4. Confidentiality** 4.1 The Service Providers, their Subcontractors, and the Personnel of either of them shall not disclose any proprietary or confidential information relating to the Project, the Services, this Contract, or the Procuring Entity's business or operations without the prior written consent of the Procuring Entity.
- 5. Project Manager's Decisions** 5.1 Except where otherwise specifically stated, the Project Manager will decide contractual matters between the Procuring Entity and the Contractor in the role representing the Procuring Entity.
- 6. Delegation** 6.1 The Project Manager may delegate any of his duties and responsibilities to other people except to the Adjudicator, after notifying the Contractor, and may cancel any delegation after notifying the Contractor.
- 7. Communications** 7.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.
- 8. Subcontracting** 8.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Procuring Entity in writing. Subcontracting shall not alter the Contractor's obligations.
- 9. Other Contractors** 9.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Procuring Entity between the dates given in the Schedule of Other Contractors, as referred to in the **Contract Data Sheet**. The Contractor shall also provide facilities and services for them as described in the Schedule. The Procuring Entity may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification
- 10. Personnel** 10.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel, as referred to in the **Contract Data Sheet**, who shall be appropriately qualified and registered with the appropriate bodies to carry out the functions stated in the Schedule or other personnel approved by the Project Manager. The Project Manager will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Schedule.
- 10.2 If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

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- 11. Procuring Entity's and Contractor's Risks**
- 11.1 The Procuring Entity carries the risks which this Contract states are Procuring Entity's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.
- 12. Procuring Entity's Risks**
- 12.1 From the Start Date until the Defects Correction Certificate has been issued, the following are Procuring Entity's risks:
- a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to:
 - (i) Use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works; or
 - (ii) Negligence, breach of statutory duty, or interference with any legal right by the Procuring Entity or by any person employed by or contracted to him except the Contractor.
 - b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Procuring Entity or in the Procuring Entity's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.
- 12.2 From the Completion Date until the Defects Correction Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Procuring Entity's risk except loss or damage due to:
- (a) A Defect which existed on the Completion Date;
 - (b) An event occurring before the Completion Date, which was not itself an Procuring Entity's risk; or
 - (c) The activities of the Contractor on the Site after the Completion Date.
- 13. Contractor's Risks**
- 13.1 From the Starting Date until the Defects Correction Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Procuring Entity's risks are Contractor's risks.
- 14. Insurance**
- 14.1 The Contractor shall provide, in the joint names of the Procuring Entity and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the **Contract Data Sheet** for the following events which are due to the Contractor's risks:
- (a) Loss of or damage to the Works, Plant, and Materials;
 - (b) Loss of or damage to Equipment;
 - (c) Loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and

	(d) Personal injury or death.
	14.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.
	14.3 If the Contractor does not provide any of the policies and certificates required, the Procuring Entity may effect the insurance which the Contractor should have provided and recover the premiums the Procuring Entity has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.
	14.4 Alterations to the terms of insurance shall not be made without the approval of the Project Manager.
	14.5 Both parties shall comply with any conditions of the insurance policies.
15. Site Investigation Reports	15.1 The Contractor, in preparing the Tender, shall rely on any Site Investigation Reports referred to in the Contract Data Sheet , supplemented by any information available to the Tenderers.
16. Queries about the Contract Data Sheet	16.1 The Project Manager will clarify queries on the Contract Data Sheet .
17. Contractor to Construct the Works	17.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.
18. Commencement and Completion	18.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Programme submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.
19. Approval by the Project Manager	19.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, who is to approve them if they comply with the Specifications and Drawings.
	19.2 The Contractor shall be responsible for the design of Temporary Works.
	19.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.
	19.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.
	19.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before their use.
20. Protection of the Environment	20.1 The Contractors shall take all reasonable steps to protect the environment and to limit damage and nuisance to people and

	property resulting from pollution, noise and other results of his operations.
	20.2 The Contractors shall ensure that emissions, surface discharges and effluent from his activities shall not exceed prescribed values in the environmental laws.
21. Labour Laws	21.2 The Contractor shall comply with all the relevant labour laws applicable in the Country, including laws relating to workers employment, working hours, health, safety, welfare, and immigration, and shall allow them all their legal rights.
	21.2 The Contractor shall require his employees to obey all applicable laws, including those concerning safety at work.
22. Health and Safety	22.1 The Contractor shall at all times take all reasonable precautions to maintain the health and safety of his personnel.
	22.2 The Contractor shall ensure that first aid facilities are available at all times at the site and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.
	22.3 The Contractor shall notify the Procuring Entity details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety, and welfare of persons, and damage to the property, as the Procuring Entity may reasonably require.
	22.4 The Contractor shall conduct an HIV-Aids awareness programme, and shall take other such measures as specified in the Contract Data Sheet to reduce the risk of transfer of HIV virus between and among Contractor personnel, the Procuring Entity's Staff and the surrounding community.
23. Discoveries	23.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Procuring Entity. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.
24. Possession of the Site	24.1 The Procuring Entity shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data Sheet , the Procuring Entity will be deemed to have delayed the start of the relevant activities, and this will be a Compensation Event.
25. Access to the Site	25.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.
26. Instructions, Inspections and Audits	26.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.
	26.2 The Contractor shall permit the Kenya Government to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed

by the Kenya Government, if so required by the Kenya Government

- 27. Disputes**
- 27.1 If the Contractor believes that a decision taken by the Project Manager was either outside the authority given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Project Manager's decision.
- 28. Procedure for Disputes**
- 28.1 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.
- 28.2 The Adjudicator shall be paid by the hour at the rate specified in the **Tender Data Sheet** and **Contract Data Sheet**, together with reimbursable expenses of the types specified in the **Contract Data Sheet**, and the cost shall be divided equally between the Procuring Entity and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision will be final and binding.
- 28.3 The arbitration shall be conducted in accordance with the arbitration procedure published by the institution named and in the place shown in the **Contract Data Sheet**.
- 29. Replacement of Adjudicator**
- 29.1 Should the Adjudicator resign or die, or should the Procuring Entity and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator will be jointly appointed by the Procuring Entity and the Contractor. In case of disagreement between the Procuring Entity and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority designated in the **Contract Data Sheet** at the request of either party, within 14 days of receipt of such request.

B. Time Control

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- 30. Programme**
- 30.1 Within the time stated in the **Contract Data Sheet**, the Contractor shall submit to the Project Manager for approval a Programme showing the general methods, arrangements, order, and timing for all the activities in the Works.
- 30.2 An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.
- 30.3 The Contractor shall submit to the Project Manager for approval an updated Programme at intervals no longer than the period stated in the **Contract Data Sheet**. If the Contractor does not submit an updated Programme within this period, the Project Manager may withhold the amount stated in the **Contract Data Sheet** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted.
- 30.4 The Project Manager's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Project Manager again at any time. A revised Programme shall show the effect of Variations and Compensation Events
- 31. Extension of the Intended Completion Date**
- 31.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.
- 31.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
- 32. Acceleration**
- 32.1 When the Procuring Entity wants the Contractor to finish before the Intended Completion Date, the Project Manager will obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Procuring Entity accepts these proposals, the Intended Completion Date will be adjusted accordingly and confirmed by both the Procuring Entity and the Contractor.
- 32.2 If the Contractor's priced proposals for acceleration are accepted by the Procuring Entity, they shall be incorporated in the Contract Price and treated as a Variation.
- 33. Delays Ordered by the Project Manager**
- 33.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.

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- 34. Management Meetings**
- 34.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
- 34.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Procuring Entity. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
- 35. Early Warning**
- 35.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.
- 35.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

C. Quality Control

- 36. Identifying Defects**
- 36.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.
- 37. Tests**
- 37.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.
- 38. Correction of Defects**
- 38.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the **Contract Data Sheet**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
- 38.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.
- 38.3 If the Contractor has not corrected a defect within the time specified in the Procuring Entity's notice, a penalty for lack of performance will be paid by the Contractor. The amount to be

paid will be calculated as a percentage of the cost of having the defect correct, assessed as described in Clause 39.

39. Uncorrected Defects

39.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

D. Cost Control

40. Bill of Quantities

40.1 The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.

40.2 The Bill of Quantities is used to calculate the Contract Price. The Contractor shall be paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

41. Changes in the Quantities

41.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change.

41.2 The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Procuring Entity.

41.3 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.

42. Variations

42.1 All Variations shall be included in the updated Programmes produced by the Contractor.

43. Payments for Variations

43.1 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

43.2 If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work is above the limit stated in Sub-Clause 41.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.

43.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's

own forecast of the effects of the Variation on the Contractor's costs.

43.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

43.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.

44. Cash Flow Forecasts

44.1 When the Programme is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.

45. Payment Certificates

45.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

45.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor within twenty eight 28 days of receipt of the certificate from the contractor.

45.3 The value of work executed shall be determined by the Project Manager.

45.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.

45.5 The value of work executed shall include the valuation of Variations and Compensation Events.

45.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

45.7 The Project Manager shall not be bound to certify any payment, if the net amount, after all retentions and deductions would be less than minimum amount of Interim Payment Certificate stated in the **Contract Data Sheet**.

46. Payments

46.1 Payments shall be adjusted for deductions for advance payments and retention. The Procuring Entity shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Procuring Entity makes a late payment, the Contractor shall be paid interest on the late payment in the next payment Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made as indicated in the **Contract Data Sheet**.

46.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon

which the increased amount would have been certified in the absence of dispute.

46.3 Unless otherwise stated, all payments and deductions will be paid or charged in the proportions of currencies comprising the Contract Price.

46.4 Items of the Works for which no rate or price has been entered in will not be paid for by the Procuring Entity and shall be deemed covered by other rates and prices in the Contract.

47. Compensation Events

47.1 The following shall be Compensation Events:

(a) The Procuring Entity does not give access to a part of the Site by the Site Possession Date stated in the **Contract Data Sheet**.

(b) The Procuring Entity modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.

(c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.

(d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.

(e) The Project Manager unreasonably does not approve a subcontract to be let.

(f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to Tenderers (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.

(g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Procuring Entity, or additional work required for safety or other reasons.

(h) Other contractors, public authorities, utilities, or the Procuring Entity does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

(i) The advance payment is delayed.

(j) The effects on the Contractor of any of the Procuring Entity's Risks.

(k) The Project Manager unreasonably delays issuing a Certificate of Completion.

(l) Other Compensation Events described in the Contract or determined by the Project Manager shall apply.

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- 47.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.
- 47.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager will assume that the Contractor will react competently and promptly to the event.
- 47.4 The Contractor shall not be entitled to compensation to the extent that the Procuring Entity's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.
- 48. Taxes**
- 48.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days before the submission of Tenders for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of Clause 50.
- 49. Currencies**
- 49.1 Where payments are made in currencies other than the Kenya Shillings, the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Tender.
- 50. Price Adjustment**
- 50.1 The amounts payable to the Contractor, in various currencies pursuant to Sub-Clause 45.1, shall be adjusted in respect of the rise or fall in the cost of labour, Contractor's Equipment, Plant, materials, and other inputs to the Works, by applying to such amounts the formulae prescribed in this clause based on the prevailing consumer price index obtained from the Central Bureau of Statistics or the monthly inflation rate issued by the Central Bank of Kenya.
- 50.2 To the extent that full compensation for any rise or fall in costs to the Contractor is not covered by the provisions of this or other clauses in the Contract, the unit rates and prices included in the Contract shall be deemed to include amounts to cover the contingency of such other rise or fall of costs.

50.3 The adjustment to be applied to amount payable to the Contractor as certified in Payment Certificates shall be determined formulae for each of the currencies in which the Contract Price is payable. No adjustment is to be applied to work valued on the basis of Cost or current prices. The formulae shall be as follows;

$$P_n = a + b \frac{L_n - L_o}{L_o} + c \frac{M_n - M_o}{M_o} + d \frac{E_n - E_o}{E_o} + \text{etc.}$$

where;

P_n is a price adjustment factor to be applied to the amount in each specific currency for the payment of the work carried out in the subject month, where such variations and daywork are not otherwise subject to adjustment;

a is a constant, specified in the **Appendix to Tender**, representing the nonadjustable portion in contractual payments;

b, c, d, etc., are weightings or coefficients representing the estimated proportion of each cost element (labour, materials, equipment usage, etc.) in the Works or sections thereof, net of Provisional Sums, as specified in the **Appendix to Tender**; the sum of a, b, c, d, etc., shall be one;

L_n, M_n, E_n, etc., are the current cost indices or reference prices of the cost elements in the specific currency of origin for month “**n**,” determined pursuant to Sub-Clause 50.5, applicable to each cost element; and

L_o, M_o, E_o, etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 50.5

The value of net work done, certified by the Project Manager, in any monthly Interim or Final Certificate as payable by the Procuring Entity to the Contractor before deduction of any retention money shall be increased or decreased by an amount of ‘**F**’.

$$F = P_n \times P_c$$

where;

The effective value **Pc** of work done which is to be subjected to increase or decrease shall be the difference between:

- (i) the amount which, in the opinion of the Project Manager, is due to the Contractor under Clause 45 (before deduction of retention money and before deducting sums previously paid on account) less:
 - any amount for payment or repayment of any advance payment;
 - any amount for materials on site (if any);
 - any amounts for nominated sub-contractors (if any)
 - any amounts for any other items based on actual cost or current prices; or
 - any sums for increase or decreases in the Contract Price paid under this Sub-Clause

and

- (ii) the amount calculated in accordance with (i) above of this Sub-clause and included in the last preceding statement.

50.4 The sources of indices shall be those listed in the **Appendix to Tender**, as approved by the Engineer. Indices shall be appropriate for their purpose and shall relate to the Contractor's proposed source of supply of inputs on the basis of which his Contract Price and expected foreign currency requirements shall have been computed. As the proposed basis for price adjustment, the Contractor shall have submitted with his Tender the tabulation of Weightings and Source of Indices in the **Appendix to Tender**, which shall be subject to approval by the Engineer.

50.5 The base cost indices or prices shall be those prevailing on the day 28 days prior to the latest date for submission of Tenders. Current indices or prices shall be those prevailing on the day 28 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, provisional indices as determined by the Engineer will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available.

50.6 If the Contractor fails to complete the Works within the time for completion prescribed under Clause 58 adjustment of prices thereafter until the date of completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favourable to the Procuring Entity, provided that if an extension of time is granted pursuant to Clause 28, the above provision shall apply only to adjustments made after the expiry of such extension of time.

50.7 The weightings for each of the factors of cost given in the **Appendix to Tender** shall be adjusted if, in the opinion of the Engineer, they have been rendered unreasonable, unbalanced, or inapplicable as a result of varied or additional work already executed or instructed under Clause 43 or for any other reason.

51. Retention

- 51.1 The Procuring Entity shall retain from each payment due to the Contractor the proportion stated in the **Contract Data Sheet** until Completion of the whole of the Works.
- 51.2 On completion of the whole of the Works, half the total amount retained shall be repaid to the Contractor and the other half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected.
- 51.3 On completion of the whole Works, the Contractor may substitute retention money with an “on demand” Bank guarantee.

52. Liquidated Damages

- 52.1 The Contractor shall pay liquidated damages to the Procuring Entity at the rate per day stated in the **Contract Data Sheet** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the **Contract Data Sheet**. The Procuring Entity may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor’s liabilities.
- 52.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in Sub-Clause 46.1.
- 52.3 If the Contractor has not corrected a defects within the time specified in the Procuring Entity’s notice, the Procuring Entity will assess the cost of having the defect corrected, the Contractor will pay this amount, and a penalty for lack of performance calculated as described in Clause 38.

53. Bonus

- 53.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day stated in the **Contract Data Sheet** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.

54. Advance Payment

- 54.1 The Procuring Entity shall make advance payment to the Contractor of the amounts stated in the **Contract Data Sheet** by the date stated in the **Contract Data Sheet**, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Procuring Entity in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest will not be charged on the advance payment.
- 54.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by

supplying copies of invoices or other documents to the Project Manager.

54.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.

55. Performance Securities

55.1 The Performance Security shall be provided to the Procuring Entity no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Procuring Entity, and denominated in the types and proportions of the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee, and until one year from the date of issue of the Completion Certificate in the case of a Performance Bond.

56. Dayworks

56.1 If applicable, the Dayworks rates in the Contractor's Tender shall be used for small additional amounts of work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.

56.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.

56.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

57. Cost of Repairs

57.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

58. Completion Certificate

58.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager will do so upon deciding that the work is completed.

59. Taking Over

59.1 The Procuring Entity shall take over the Site and the Works within seven days of the Project Manager's issuing a certificate of Completion.

60. Final Account

60.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56

days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.

61. Operating and Maintenance Manuals

- 61.1 If “as built” Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the **Contract Data Sheet**.
- 61.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the **Contract Data Sheet**, or they do not receive the Project Manager’s approval, the Project Manager shall withhold the amount stated in the **Contract Data Sheet** from payments due to the Contractor.

62. Termination

- 62.1 The Procuring Entity or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.
- 62.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:
- (a) The Contractor stops work for 28 days when no stoppage of work is shown on the current Programme and the stoppage has not been authorized by the Project Manager;
 - (b) The Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;
 - (c) The Procuring Entity or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
 - (d) A payment certified by the Project Manager is not paid by the Procuring Entity to the Contractor within 84 days of the date of the Project Manager’s certificate;
 - (e) The Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;
 - (f) The Contractor does not maintain a Security, which is required; and
 - (g) The Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the **Contract Data Sheet**.
 - (h) If the Contractor, in the judgment of the Procuring Entity has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this paragraph:

“corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution and includes inter alia, bribery and extortion or

coercion which involves threats of injury to person ,property or reputation, and.

“fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Procuring Entity, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Procuring Entity of the benefits of free and open competition.

62.3 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under Sub-Clause 62.2 above, the Project Manager shall decide whether the breach is fundamental or not.

62.4 Notwithstanding the above, the Procuring Entity may terminate the Contract for convenience.

62.5 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

63. Payment upon Termination

63.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as indicated in the **Contract Data Sheet**. Additional Liquidated Damages shall not apply. If the total amount due to the Procuring Entity exceeds any payment due to the Contractor, the difference shall be a debt payable to the Procuring Entity.

63.2 If the Contract is terminated for the Procuring Entity’s convenience or because of a fundamental breach of Contract by the Procuring Entity, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor’s personnel employed solely on the Works, and the Contractor’s costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.

64. Property

64.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Procuring Entity if the Contract is terminated because of the Contractor’s default.

65. Release from Performance

65.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Procuring Entity or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.

**66. Suspension of
Financing**

66.1 In the event that the source of financing is suspended to the Procuring Entity, from which part of the payments to the Contractor are being made:

- (a) The Procuring Entity is obligated to notify the Contractor of such suspension within 7 days of having received the financing agency's suspension notice.
- (b) If the Contractor has not received sums due it within the 28 days for payment provided for in Sub-Clause 46.1, the Contractor may immediately issue a 14-day termination notice.

SECTION V: CONTRACT DATA SHEET (CDS)
Contract Data Sheet

Instructions for completing the Contract Data Sheet

CDS Clause	GCC Clause	Description
1	1.1	<p>A. General</p> <p>(Itemise Definitions to take the same numbering as per the General Conditions)</p> <p>The Procuring Entity is Central Rift Valley Water Works Development Agency</p> <p>The Adjudicator is Chairman IEK</p> <p>The Defects Liability Period is 180 days.</p> <p>The Project Manager is General Manager – Technical Services, CRVWWDA</p> <p>The name and identification number of the Contract is CRVWWDA/NYA/OBWSP/ABORETUM/2020-2021</p> <p>The Works consist of</p> <ul style="list-style-type: none"> • Drilling of 1No 8” Ø borehole 200m deep • Pumping System & Solar Equipment with a submersible pump Provisional Sum of Kshs.3,000,000 • Construction of 1No 24m³ steel tank on 18m high Steel Tower • Construction of Water Kiosk • Fencing of Borehole Site 200m and Steel Gate • Installation of Token system for water purchase. <p>The objectives of the contract are Provide the residents of Aboretum Area in Ol Kalou with potable water for Human Consumption which are mandatory requirements that override any detail which may be provided below.</p> <p>The Start Date shall be 14 Days after Contract Signing</p> <p>The Intended Completion Date for the whole of the Works shall be 90 Days after Start Date</p> <p>The following documents also form part of the Contract: Notification of award Letter of acceptance Work programme Performance bond Particular Conditions</p>

		<p>General conditions of contract</p> <p>Specifications</p> <p>Drawings</p> <p>Priced bill of quantities</p> <p>Schedule Of Personnel</p> <p>The Site is located at Aboretum in Ol Kalou Town of Nyandarua County. And is defined in drawings No:N/A</p>
2.	2.2	Indicate whether there is sectional completion N/A
3.	2.3(9)	<p>List other documents that form part of the contract if any:</p> <p>a) Any other documents relevant to the contract as shall be determined during and after contract signature</p> <p>The Site is located at Nyandarua County</p>
4.	3.1	<p>The language of the Contract documents is English</p> <p>The law that applies to the Contract is the Kenyan Law.</p>
5.	9.1	<p>Include the Schedule of Other Contractors, if any.</p> <p>N/A</p>
6.	10.1	<p>Include the Schedule of Key Personnel.</p> <ul style="list-style-type: none"> • Site Agent • Foreman • Driller • Electrician • Mason
7.	14.1	<p>The minimum insurance covers shall be: As per Kenya Law</p> <p>(a) loss of or damage to the Works, Plant, and Materials</p> <p>(b) loss of or damage to Equipment and vehicles;</p> <p>(c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract and</p> <p>(d) personal injury or death</p>
8.	15.1	<p>Site Investigation Reports available to the Tenderers are:</p> <p>N/A</p>
9.	22.4	<p>The other measures include:</p> <p>a. Minimising the number of migrant workers employed on the project and household in the site camp</p> <p>b. Providing access to voluntary counselling and testing (VCT)</p> <p>c. Providing psychological support and health care including prevention and treatment of opportunistic infections for workers infected and affected, as well as their families</p>

		d. Providing condoms (male and female) to workers
10.	24.1 & 47.1	The Site Possession Date shall be at least 7(seven) days after signing the contract
11.	28.2	Hourly rate of Fees payable to the Adjudicator is: To be agreed by the parties Types of reimbursable expenses to be paid to the Adjudicator include: To be agreed by the parties
12.	28.3	Arbitration will take place at <i>Nakuru</i> in accordance with rules and regulations published by Chartered Institute Of Arbitrators-Kenya Chapter
13.	29.1	Appointing Authority for the Adjudicator: Chairman IEK
B. Time Control		
14.	30.1	The Contractor shall Submit a Programme for the Works within 2days of delivery of the Letter of Acceptance.
15.	30.3	The period between Programme updates is 5 days.
16.	30.3	The amount to be withheld by the Project Manager in the case the contractor does not submit an updated programme is Kshs. 10,000 (Ten thousand Kenya shillings).
C. Quality Control		
17.	38.1	The Defects Liability Period is 180 days.
D. Cost Control		
18.	45.7	Minimum Amount of Interim Payment Certificate will be 30% of the contract sum
19.	46.1	The interest rate shall be N/A..% above prevailing interest rate for commercial borrowing from the contractors bank
20.	47.1(a)	The Site Possession Date shall be at least 7(seven) days after signing the contract
21.	50	The contract is not subject to price adjustment in accordance with Clause 50 of the General Conditions of Contract.
22.	51.1	The amount of retention is 10% of value of works of Interim Payment Certificate’.
		Limit of retention will be 50% of contract price.
23.	52.1	The rate of liquidated damages is 0.15 percent of contract price per day
	52.1 62.2 (g)	The maximum amount of liquidated damages is 5% of Contract Price

24.	53.1	The bonus for early completion isN/A.....
25.	54.1	The amount of advance payment shall be ...N/A
		Monthly Recovery of Advance Payment: N/A percent of amount of Interim Payment Certificate.
26.	55.1	The Performance Security shall be 10% of the contract price
		E. Finishing the Contract
27.	61.1	As built drawings shall be supplied by the contractor byN/A..... Operating manual shall be supplied by the contractor by N/A
28.	61.2	The amount to be withheld by the Project Manager in the case the contractor does not submit as built drawings is:N/A The amount to be withheld by the Project Manager in the case the contractor does not submit operating manual is:.....N/A.....
29.	63.1	The percentage to apply to the value of the work not completed, representing the Procuring Entity's additional cost for completing the Works, is N/A

SPECIFICATIONS.

1. GENERAL SPECIFICATIONS

1.1 Introduction

These specifications cover the construction of the works as shown on the drawings and listed in the Bills of Quantities and shall be read in conjunction with the Contract Documents as listed in Volume I, Instructions to Tenderers.

All references given are intended solely for the convenience of those using the above documents and shall be in no way exclude the application of the other clauses in the documents which may, in the opinion of the Engineer have any bearing on the point in question.

1.1.1 Location

The site for the proposed Aboretum Borehole is in Ol Kalou town , Ol Kalou Constituency in Nyandarua County.

1.1.2 Scope of Works

The Works consist of

- **Drilling of 1No 8" Ø borehole 200m deep**
- **Pumping System & Solar Equipment with a submersible pump Provisional Sum of Kshs.3,000,000**
- **Construction of 1No 24m³ steel tank on 18m high Steel Tower**
- **Construction of Water Kiosk**
- **Fencing of Borehole Site 200m and Steel Gate**
- **Installation of Token system for water purchase**

2 Extent of Contracts

The works specified under this contract shall include all general works preparatory to the construction of the works and materials and work of any kind necessary for the due and satisfactory construction, completion and maintenance of the works to the intent and meaning of the Drawings and this specifications and further Drawings and instructions that may be issued by the Engineer from time to time whether specifically mentioned or not into the clauses of this specification.

1.3 Precedence of Contract Documents

Should the provisions of any clauses of any or all of the Contract Documents to be shown to be mutually at variance or exclusive, the following order of precedence shall be applied in order to establish which of the said provisions mutually at variance or exclusive, shall be deemed to be true and correct intent of the contract entered into by Employer, and the Contractor shall forthwith be absolved from any liability under the provisions not so proved to be the true and correct intent of the contract, provided that in the execution of the contract the Contractor has, or shall have complied with such true and correct intent.

(i) Provision of the Standard or Special Specifications shall take precedence over those of the General Conditions of Contract.

(ii) Provision of the Special Specifications shall take precedence over the Standard Specifications unless otherwise indicated.

(iii) Details shown or noted on the Contract drawings shall take precedence over the requirements of both the Standard and the Special Specifications.

(iv) Detail Drawings shall take precedence over General Drawings.

(v) Within the Standard Specifications, the provisions of any section particular to the provisions at variance shall take precedence over the General Section, and within any section clauses particular to the provisions at variance shall take precedence over those not so particular. The foregoing order of precedence shall apply also to sections and clauses of the Special Specifications.

(vi) Where there is conflict in units of measurement quoted in Standard Specifications and units quoted in Bills of Quantities the units in latter will apply.

Notwithstanding any fore-written provisions, should the application of the foregoing order of precedence fail to resolve any variance or mutual exclusions as to the true and correct intent of the contract to the satisfaction of the Engineer, the Engineer may exercise the right to arbitrarily give a ruling as to the true and correct intention of the contract, and the Contractor shall have the right to claim additional payment for any additional expenses incurred by him as a consequence of such variance or exclusion and arbitrary ruling.

1.4 Standards

In the specifications, Bills of Quantities, and Drawing reference has been made to relevant British Standard Specifications and Codes of Practice- to which the materials and workmanship should comply with. However, the materials and workmanship complying with equivalent Kenya Bureau of Standards (KEBS) or International Standards Organization (I.S.O) standard for that particular material or workmanship will also be acceptable. Mixture of different Standards in one trade will not be allowed. For instance, if pipes are to be provided to KEBS Standard, then all the pipes in the works are to be to KEBS Standard.

Where the dimension in one standard does not completely correspond to the dimension of the other standard which is being used for construction of works, ruling of the Engineer will be sought and any decision given by the Engineer will be final and binding upon the Contractor.

1.5 Quality of Materials and Workmanship

The materials and workmanship shall be of the best of their respective kinds and shall be to the approval of the Engineer. In reading of these Specifications, the words "to the approval of the Engineer" shall be deemed to be included in the description of all materials incorporated in the works, whether manufactured or natural, and in the description of all operations for the due execution of the works.

No materials of any description shall be used without prior approval by the Engineer and any condemned as unfit for use in the works shall be removed immediately from the site, and without recompense to, the Contractor. All works or parts thereof shall be in accordance with the latest edition of either Kenya Bureau of Standards (KEBS) Specification or British Standard (B.S) Specifications and British Codes of Practices (C.P) as published by British Standard Institution.

All materials shall be of approved manufacture and origin and the best quality of their respective kind, equal to sample and delivered on to the site a sufficient period before they are required to be used in the works to enable the Engineer to take such samples as he may require for testing or approval, and the Contractor shall furnish any information required by the Engineer as to the quality, weight, strength, description, etc. of the materials. No materials of any description shall be used without prior approval

by the Engineer and any condemned as unfit for use in the works shall be removed immediately from the site by, and without recompense to, the Contractor.

1.11 Trade Names

Trade Names and Catalogue References are given solely as the guide to the quality and alternative manufacturers of the materials or goods of equivalent quality will be accepted at the discretion of the Engineer.

1.7 Samples

Samples of all materials shall be deposited with the Engineer and approved prior to ordering or delivery to site. The Engineer reserves his right to test any sample to destruction and retain samples until the end of the maintenance period. No payment will be made for samples and the Contractor must in the rates of prices allow for costs of samples. All materials delivered to site shall be equal or better in all respects than the samples delivered to the Engineer.

All sampling of materials on the site must be done by or in the presence of the Engineer. All other samples will be deemed not to be valid under the contract.

All material delivered to the site or intended for the works not equal or better than the samples approved by the Engineer shall be removed and replaced at the Contractor's expense.

1.8 Testing

As provided in Clause 311 of the Conditions of Contract and in accordance with the Specification quoted for any material used on works of this contract, tests may be called upon by the Engineer to be carried out at the place of manufacture or on the site. The Contractor may assume that the tests will be required on soils, workmanship, and materials whether natural or manufactured to verify their compliance with the specifications. Samples of all such materials and manufactured articles together with all necessary labour, materials, plant and apparatus for sampling and for carrying out of the tests shall be supplied by the Contractor at his own expense.

1.9 Programme for the Execution of Works

(i) In accordance with Clause 14 of the Conditions of Contract, the Contractor upon receiving Engineer's order to commence shall within 7 days draw up a working programme setting out order in which the works are to be carried out with appropriate dates thereof together with delivery dates for materials. The Contractor shall together with his work programme supply an expenditure chart showing monthly anticipated expenditure.

(ii) The programme shall be deemed to have taken into account normal variations in climatic conditions to provide for completion of the works in the order and within the times specified therein.

(iii) The order in which it is proposed to execute the permanent works shall be subject to adjustment and approval by the Engineer, and Contractor's price shall be held to include for any reasonable and necessary adjustment required by the Engineer during the course of the works.

(iv) The Contractor shall carry out the contract in accordance with the programme agreed with the Engineer, but he shall in no manner be relieved by the Engineer's approval of the programme of his obligations to complete the works in the prescribed order and by the prescribed completion date and he shall from time to time review his progress and make such amendments to his rate or executions of the works as may be necessary to fulfil these obligations.

(v) Once the proposed programme is approved by the Engineer, the Contractor shall not depart from the programme without the written consent of the Engineer. In the event of unforeseen difficulties or disturbances arising, which forces the Contractor to depart from the approved programme of works, he shall advise the Engineer in writing of such occurrences without delay and submit proposals for any necessary remedial measures, for which he shall obtain the Engineer's approval before putting such measures into effect.

(vi) The Contractor shall furnish the Engineer with a monthly statement of all works done on the contract and of all materials on site.

1.10 Substantial (Practical) Completion

Substantial or Practical Completion of Works is to be understood as a state of completion, which leaves out only minor outstanding items that can be readily completed within a period of less than 1 month without interfering with the normal operation of the works.

The works will not be considered as substantially or practically completed without the works being capable of being used by the Employer in accordance with the purpose of the works. This means amongst other things and where relevant, that all final tests have been carried out, the pumping stations and treatment plant fully operational to the required capacity, all storage tanks filled up, operation manuals provided, and clearance of the site upon completion of the works has been carried out, all to the satisfaction of the Engineer.

The Contractor shall allow for a period of one month for the completion by others of as built drawings before the works are handed over to the Employer.

1.11 Nominated Sub-Contractors and Nominated Supplies

The Contractor shall be responsible for Nominated Sub-Contractor in responsibility to ensure that each Sub-Contractor commences and completes the work in a manner so as to conform with the working programme, as specified above.

It is also the responsibility of the Contractor to ensure a satisfactory progress of the works and to ensure that the works are completed to a standard satisfactory to the Engineer.

The Contractor shall accept liability for and bear the cost of General and Specific Attendance on Nominated Sub-Contractors which shall be deemed to include for:-

(i) Allowing the use of standing scaffolding, providing special scaffolding, maintenance and alteration of all scaffolding, retention of all scaffolding until such time as all relevant Sub-Contractor's works are complete and removal of all scaffolding on completion.

(ii) Providing equipment and labour for unloading and hoisting SubContractor's materials.

(iii) Providing space for office accommodation, and for storage of plant and materials; allowing use of sanitary accommodation; the supply of all necessary water, power, lighting and watching and clearing away all rubbish.

Carting away for and making good after the work of Sub-Contractors as may be required will be measured and valued separately in the Bills of Quantities.

Before placing any orders with nominated Sub-Contractors or nominated Suppliers, the Contractor should enter into an agreement with the nominated Sub-Contractor/nominated Suppliers to ensure that the Conditions and delivery of materials to site comply with the conditions of contract and the working programme.

Particular clause should be inserted in the agreement with the nominated Suppliers ensuring the validity of the rates for the supply of materials as per the delivery schedule.

Nominated Suppliers who are unable to meet the delivery schedule will not be given allowance for any increases in prices incurred after the delivery time agreed in the delivery schedule.

1.12 Entry upon Land, Working Site and Adjoining Lands

The Employer shall provide land, right of ways and way leaves for work specified in the contract.

If nothing else is mentioned, the Contractor will be allotted for execution of the works only the actual area as necessary for the extent of the construction.

The Contractor shall give notice to the Engineer at least 14 days before he wishes to enter onto the land required to carry out the Contract.

The Contractor shall not enter onto any land or commence any operations until such time as he receives formal confirmation from the Engineer that all necessary compensation formalities have been completed and that permission has been obtained from the landowner to enter the land and commence operations. Should the Contractor enter onto any land or commence operations without first obtaining this confirmation, he shall be liable in whole or in part, at the sole discretion of the Engineer, for all additional costs and/or legal charges which might arise therefore.

The Contractor shall on his own accord obtain rights of admission, and Right of using all other areas which are necessary for storing and manufacturing, or for setting up site offices and Resident Engineer's office or whatsoever will be necessary. No separate payment will be made to the Contractor on account of these items and the Contractor must make due allowance for them in his rates.

The Contractor shall take care to prevent injury, damage and trespass on lands, fences and other properties near and adjacent to the works and must in this connection make all necessary arrangements with adjoining landowners, or into the case of Government Property with officers appointed for this purpose, and ensure the Workmen's observance of all Government rules and Ordinances regarding game protection and other matters and provide, maintain and clear away on completion of the Works, all temporary fencing which may be required for execution of the works.

Before completion of the works, the Contractor must make good or compensate any such injury, damage or trespass on Lands, fences and other properties which have no otherwise been provided for in the Contract.

1.13 Preservation of Survey Beacons

Ordinance Survey Beacons, Bench marks, etc., or around the site of the works shall not be disturbed unless permission has been obtained by the Engineer from the Survey of Kenya.

In the event of unauthorized disturbance of such beacons, bench marks etc., in the course of the works being carried out, the Contractor shall be responsible for reporting same to the Engineer and the Survey of Kenya, and for payment of any fees due to said Survey of Kenya for replacement of such disturbed beacons, bench marks, etc. The Contractor shall not replace such disturbed beacons bench marks, etc. on his own accord.

1.14 Land for Camp Site

The Employer shall make available free of charge to the Contractor all land under or through which the works other than Temporary Works are to be executed or carried out all as indicated in the Drawings or as detailed in the Specifications. Such land shall exclude land for Resident Engineer's

offices and land required by the Contractor for his own camps, offices, houses, temporary works or any other purpose.

1.15 Existing Services

Drains, pipes, cables and similar services encountered in the course of the Works shall be guarded from damage by the Contractor at his own cost to safeguard a continued uninterrupted use to the satisfaction of the owners thereof, and the Contractor shall not store materials or otherwise occupy any part of the site in the manner likely to hinder the operation of such services.

The Contractor shall on the Engineer's direction arrange for the construction of permanent or temporary diversions of the said drains etc., together with their reinstatement in liaison with the respective Departments, Bodies, Corporations or Authorities. The cost of such works or diversions including reinstatement shall be charged against the appropriate provision sum provided into the Bills of Quantities. The Contractor shall be at liberty, subject to the approval of the works, bear the cost of reinstatement of addition diversion. No services may be tampered with by the Contractor and all works in connection with any kind of services shall be carried out by their respective owners.

It is the responsibility of the contractor to inform the Engineer immediately any existing service is exposed.

1.111 Damage to Services

The Contractor shall be held liable for all damage and interference to mains and pipes, to electric cables or lines of any kind either above or below ground caused by him or his Sub-contractors in execution of the Works, whether such services are located on the Contractor's Drawings or not. The contractor must make good or report to the appropriate authorities the same without delay and do any further work considered by the Engineer or owner. The Contractor shall provide for these contingencies in the rates inserted in the Bills of Quantities.

1.17 Temporary Roads and Traffic Control

The contractor shall provide and maintain all temporary roads, bridges and other work required for the construction of the Work including the access to quarries, borrow-pits, accommodation etc.

1.18 Road Closure

Where a road used by the Contractor for delivery of any materials used in the works is closed under Section 71 of the Traffic Ordinance Act 19112 or amendments thereto, the contractor shall obey such closure order and use alternative roads.

1.19 Road and Railway Crossing and Traffic Control

Whether the pipeline is crossing the classified roads and railway line, the Contractor will contact the relevant authorities in advance and obtain necessary permission to dig across the road and railway line in accordance with requirement of the authorities concerned and shall pay any royalties connected with this work, and the Contractor will provide temporary detour road together with any warning signs necessary. There will be no separate payment for this and cost of all expenses connected with road and railway crossing for which no separate items have been included in the Bills of Quantities.

1.20 Protection from Water

Unless otherwise mentioned, Contractor shall keep the whole of the Works free from water and allow in his rates for all dams, coffer, dams pumping, piling, shoring, temporary drains, slumps, etc., necessary for this purpose and shall make good at his own cost all damage caused thereby.

1.21 Weather Conditions

The Contractor shall be deemed to take into account all possible weather conditions when preparing his tender and he shall not be entitled for extra payment by the reason of the occurrence or effect of high winds, excessive rainfall, temperature or any other meteorological phenomena.

1.22 Protection from Weather

All materials shall be stored on site in a manner approved by the Engineer and the Contractor shall carefully protect from the weather all works and materials which may be affected thereby.

No separate payment will be made for this and Contractor will allow in his rate for this.

1.23 Explosive and Blasting

At works requiring the use of explosives, the Contractor shall employ men experienced in blasting, and these men must be in possession of a current blasting certificate. The purchase, transport, storage, and use of explosive shall be carried out in accordance with the most recent Explosives Ordinance and Rules issued by the Government and the Contractor shall allow in his rates for excavation and quarrying for all expenses incurred in meeting these requirements, including the provision of suitable stores. Blasting operations shall be carried out with as little interference as possible to traffic or persons and the rates shall include for all flagging, watching barricade and clearance of debris.

In all cases previous permission from the Engineer must be obtained before commencing any blasting operation.

If, in the opinion of the Engineer, blasting would be dangerous to persons or property, or it is carried out in a reckless manner, the Engineer can prohibit any further use of explosives.

1.24 Liaison with Police, etc.

The Contractor shall keep himself in close contact with the Police, Labour Officers and other officials in the areas concerned regarding their requirements in the control of workmen, passage through townships, or other matters and shall provide all assistance and/or facilities which may be required by such officials in execution of their duties in connection with the works. Any instruction given by the traffic police concerning fencing off of trenches or other excavations must be followed explicitly.

1.25 Provision of Water

The Contractor shall provide water for use in the Works. He shall supply all hydrants, hose, vessels and appliances necessary for the distribution there-of and shall provide pumps, tanks, carts, vessels and appliances, transport and labour when and where-ever it is necessary for water to be carted for use at the works. All water used in connection with the works shall if possible be obtained from a public water supply and the Contractor shall make all necessary arrangements and pay all the charges for connection to main and for water used.

1.211 Temporary Lighting

The Contractor shall provide all artificial lighting and power for use on the works, including all sub-contractors and specialists requirements and including all temporary connections, wiring, fittings, etc., and clear away on completion. The contractor shall pay all fees and charges and obtain all permits in connections there with.

1.27 Sanitation

The medical Officer of health or other Sanitary Authority shall be informed when Works are contemplated and when works are about to commence.

The site shall be kept in a clean and proper sanitary condition. No nuisance shall be committed on or around work, and latrines for the workmen and staff shall provided in accordance with the requirements of the medical officer or Sanitary Authorities. The Contractor shall be responsible for the sanitary discipline of his labour.

The Engineer's representative has the right to order, who in the opinion of the Engineer's representative does not have a satisfactory sanitary discipline, off the site with immediate effect. The Contractor shall make sure that his personnel working on the site are medically fit, and he shall bear the cost of any medical test required to determine that his personnel are free from infectious diseases.

The Contractor shall follow the safety rules set down by the Factories Inspectorate, Ministry of Labour.

1.28 Medical Facilities

Contractors attention is drawn to Legal Notice No. 79 of 22nd September 1978 by which it is mandatory that every Contractor employing more than twenty people should appoint (in writing) a safety supervisor. A safety supervisor advice the management on all matters regarding safety, hygiene and welfare of the people affected by the Contractor's undertaking on the site. The safety officer may in addition carry out other duties. The contractor shall provide adequate first-aid equipment on the site and ensure that at least two of his site staff are completely trained in first aid.

1.29 Signboards

The Contractor shall erect signboards as shown on the drawing in prominent positions adjacent to the works to the satisfaction of the Engineer. The location of the signboards shall be specified by the Resident Engineer.

1.30 Setting Out and Survey Equipment

The Contractor must before commencing any construction works, make sure that levels shown on the drawings correspond with levels found on the site.

Should any discrepancy be discovered between the level shown on the drawings and those found on the site, which may affect the level and dimensions of any part of the works, the Contractor shall notify the Engineer, who if necessary, will issue drawings showing the amended level and dimensions.

The Contractor shall allow for in his rates, the cost of the necessary qualified and experienced staff to set out the works and during the continuance of the Contract for the sole use of the Engineer, provide approved new and accurate instruments together with all other requisites, all necessary chainmen and other attendance and transport required for setting out and checking the works or purpose in connection therewith.

The major requirements are as minimum but not limited to following:

Description	No.
(a) 2 m ranging rods	11
(b) Modern Universal Theodolite and Tripod	1
(c) Automatic level and Tripod	1
(d) 4 level staff with leveling bubble	2

(e) 100 m steel tape	2
(f) 50 m steel tape	2
(g) 3 m pocket tapes	3

The contractor shall clear the site and set out the Works well in advance to enable the Engineer to inspect and approve the setting out prior to commencement of the Works. The Contractor shall amend at his own cost any error due to inaccurate setting out.

Any checking or approval by the Engineer of the setting out, bench marks, plans or schedule will not relieve the Contractor of his responsibilities under the Contract. The Contractor shall provide plan showing the position of his site offices, storage, sheds, accommodation, Engineer's Representatives office etc., to the permanent works for the approval of the Engineer before commencing erection of his camp.

1.31 Backfilling of Holes and trenches

The Contractor shall immediately upon approval of any work at his own expense and to the satisfaction of the Engineer backfill all holes trenching and temporary quarries which have been made (except permanent borrow pits), level all moulds or heaps of earth that may have been raised or made and clear away all rubbish caused by the execution of the work. The Contractor shall bear and pay all costs charges damages and expenses of any kind whatsoever which may occur by reason of holes and trenches connected with the works or materials, tools or plant being left or placed in improper situation.

1.32 Inspection of Works

No part of the works shall be built in or covered over until it has been inspected and approved by the Engineer and the Contractor must give due notice in writing to the Engineer's representative when any part of the works are ready for inspection.

1.33 Cleaning Up of Site

Before final acceptance upon the completion of the Works, the Contractor shall, at his own expenses, remove and dispose of all rubbish and remove all equipment, surplus materials camp and buildings, which the contractor has provided, and temporary works ordered by the Engineer and shall leave the Site absolutely clear thereof and in good order and condition to the entire satisfaction of the Engineer.

1.34 Testing of Water-Retaining Structure

All water-retaining structures shall on completion be tested for water tightness in the following manner. The structure shall be filled with potable water in stage and held at each stage for such time as the Engineer may require. Should any dampness or leakage occur at any stage, the water shall be drained off and the defects made good. The procedure shall be continued and finally the structure shall after a period allowed for absorption remain full for seven days. Within those seven days, the level of the surface of the water should be recorded and measurements made at intervals of 24 hours. The total leak must not exceed 0.3% of the total volume of water in the tested structure.

If the structure does not satisfy the Condition of the test, and the daily drop in water level is decreasing, the period of test may be extended for a further 7 days, and if the specified limit is then not exceeded, the structure may be considered as satisfactory.

Should any dampness or leakage or other defects occur they shall be made good and the structure re-tested until the water tightness is approved by the Engineer. Faces of submerged structures may not be covered before testing.

The Contractor shall allow in his rates for all expenses and shall provide water and all necessary labour and materials for testing the structures.

1.35 Testing of Roofs

Where structures are used for storage of potable water adequate precautions should be taken to ensure that the roof is watertight in order to give protection against a potential sources of pollution.

The roof should be tested by lagooning the concrete slab to a minimum depth of 75 mm for a period of 3 days; the roof slab should be regarded as satisfactory if no damp patches occur on the soffit. The roof screed should be completed immediately after testing.

All water, labour and materials for the test are to be provided by the contractor who shall allow for this in his rates.

1.36 Cleaning and Sterilizing Water-Retaining Structures

The interior of all potable water-retaining structure shall be thoroughly cleaned and washed after the water tightness test has been approved by the Engineer in order to remove all contamination.

The structure shall then be filled to overflow level with clean water containing 50 parts per million of chlorine and left for a period of at least 24 hours. The chlorinated water shall then be drained away and the structure refilled with clean water from which samples shall be taken for bacteriological examination and for tests of residual chlorine. If any of the results of the tests are unsatisfactory when compared with those of the control sample of the supply water, the sterilizing process shall be repeated until the results of the tests are satisfactory.

The costs of the initial sampling, analysis and preparing on the bacteriological quality of the water shall be borne by the employer, but should the initial report be unsatisfactory, the costs of any subsequent sampling analysis and preparing reports shall be borne by the Contractor.

The Contractor shall allow for - in his rates providing water, all labour, materials, chemicals and other things necessary for cleaning and sterilizing the water-retaining structures.

1.37 Contractor's Superintendence

The Contractor shall give or provide all necessary superintendence during the execution of the works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor or his competent and authorized Agent or representative approved in writing by the Engineer (which approval may at any time be withdrawn) is to be constantly on the works and shall give his whole time to the superintendence of the same. If such approval shall be withdrawn by the Engineer, the Contractor shall after receiving written notice or such withdrawal, remove the Agent from the Site within the time stated in the notice and shall replace him by another Agent approved by the Engineer.

1.38 Transport of Workmen

The Contractor shall include in his rates for all transport of staff and workmen to and from and in connection with the various parts of the works, and all costs incurred in recruiting and transporting labour to the site, where such labour is from outlying areas and costs of returning labour on termination of the contract.

1.39 Normal Working Hours

The contractor shall inform the Engineer in writing, at the time of submitting the work programme, the normal working hours. The Contractor shall respect all Public Holidays. Where the Contractor wishes to work outside these hours, he shall request the Engineer in writing at least 24 hours in advance for consideration.

1.40 Transport, Travelling and Leave

In his rates, the contractor shall allow for and be responsible for all charges which may arise out of the transport to the site of materials, plant or equipment from any source, all applicable customs duties, all licences or other costs whatsoever together with all handling, packing and insurances. The prices shall also include all charges arising out of the provision of transport to the site of staff and labour from any source and shall include all costs in respect of fares, insurances, customs, medical or other fees, subsistence, leave and all other matters.

1.41 Compliance with Statutes and Local Regulations

In addition to requirements of Clause 211 of the Conditions of Contract, the Contractor shall be responsible for acquainting himself with all current valid Statute Ordinance or Bye-Laws or Regulations provided in the Bills of Quantities. This applies to training Levy and other similar taxes for which no claims on the part of the Contractor other than the one inserted in the Bills of Quantities will be allowed.

1.42 Accommodation for Workmen

The Contractor shall provide and maintain suitable shelters and mess facilities for his workmen and supervisory staff. The facilities shall be of sufficient size and to a standard considered satisfactory by the Engineer. The Contractor shall throughout the contract provide an adequate supply of potable water for the workmen.

1.43 Storage Space and Sheds

Suitable temporary stores and workshop shall be erected and later removed on completion of the works. All building shall be adequate for protection of the equipment or materials to be kept there-in and shall be constructed and located to the satisfaction of the Engineer

1.44 Office for the Contractor

The Contractor shall erect an office near the works on the site to be kept open at all hours during which the work is in progress.

Any notice to be given to or served upon the Contractor shall be deemed and taken to be effectively given or served upon by the delivery there-of at such office on the Site.

1.45 Office for the Engineer's Representative

The contractor shall if required by special specification rent and maintain offices, laboratories, survey and laboratory equipment and furniture for the Engineer and his staff.

1.411 Housing for the Engineers Staff

The employer shall provide housing for Engineers Staff

1.47 Maintenance of the Resident Engineer's Staff Houses, Offices, Furniture and Equipment

For the entire duration of the contract the Contractor will:-

if) For rented houses, ensure that the landlord attends to any maintenance problems regularly. The furniture shall be maintained by the Contractor.

ii) Keep all buildings provided by him, for the use of the Resident Engineer and his Staff, in well maintained, clean and fully habitable condition, and shall maintain all access roads, car parks, footpaths, fences, gates, drains, potable water supplies, gas, electricity and waterborne sewage disposal system in good stage of repair, all to the satisfaction of the Engineer.

iii) The Contractor shall also provide an adequate refuse collection for all houses and offices provided by him.

iv) The Contractor shall maintain all furniture and equipment provided by him in reasonable state of repair and usable condition and shall replace promptly any item which becomes unserviceable or is lost.

v) The Contractor shall provide day and night watchmen for the Resident Engineer's staff houses whether rented or constructed by him.

The Contractor shall insert his rate against lump sum item included in Bills of Quantities for the maintenance of offices, houses equipment and furniture.

Payment for the maintenance of resident Engineer's staff houses, offices furniture and equipment will be spread over in equal monthly instalments, spread over from the time houses or offices as appropriate are taken over by the Engineer until the end of the Contract. (In the event, no interim certificate is issued in any month then the installment shall be added to subsequent certificate).

1.48 Attendance upon Resident Engineer and Resident Engineer's Staff

For duration of the Contract.

i) The Contractor shall provide all assistance including labourers, chainmen, clerks and junior staff as and when required by the resident Engineer for checking, setting out surveying measuring or for testing of work. The Contractor shall also provide a full time typist in Resident Engineer's office.

ii) The Contractor shall provide all tools and protective clothing, wooden pegs, iron pins and pickets, water cement and aggregate for concreting, transport for labourers and materials as may be required by the resident Engineer and his staff for checking, settling out, surveying, measuring or testing or the work.

An item has been included in Bills of Quantities for the above, which shall include all expenses including housing etc. which are due to the manpower. No further payment will be made for attendance upon the Engineer and Contractor shall include other costs elsewhere in his rates.

Payment for the attendance will be spread over in equal monthly instalments over the contract period. (In event, no interim certificate is issued in any month, then the instalment shall be added to the subsequent certificate).

1.49 Insurance

All buildings, furniture and equipment provided by the Contractor for the Engineer's representative shall be insured by the Contractor against loss or damage by accident, fire, theft and other risks ordinarily insured against for the duration of the contract. The theft shall include personal belongings of the tenants in the Resident Engineer's staff houses.

1.50 Transport for Engineer's Representative

The Employer shall provide transport for the Engineer's Representative.

The Contractor shall as stated in the Bills of Quantities provide maintenance, fuel and lubricants and must keep the vehicle clean and in a good roadworthy condition throughout the contract.

All maintenance shall be carried out at the prescribed intervals by an approval dealer.

In the event of service and repair with a duration of more than one day, the Contractor shall provide suitable replacement vehicle to the approval of the Engineer.

The costs of the above shall upon presentation of receipts be paid against the Provisional sums entered in the Bill of Quantities.

1.51 Removal of Camps

On the completion of the contract, the contractor shall, if so requested take down and remove all structures connected with his camp and shall take up all pipes, drains and culverts, backfill trenches, fill up all latrine pits, soakways and other sewage disposal excavations and shall restore the site as far as practicable to its origin condition and leave it neat and tidy to the satisfaction of the Engineer.

1.52 Site Meetings

Site meetings will normally be held monthly, but will be called for wherever the progress of works so require or when demanded by the Engineer.

The Contractor shall at all meetings be represented by a responsible representative other than the site Agent, who has the powers to commit the Contractor in all matters concerning the Contract.

In the event, no responsible representative of the Contractor is present at the meetings, any decision taken by the Engineer at the meeting will be binding upon the Contractor.

TECHNICAL SPECIFICATIONS

1. SITE CLEARANCE

1.1 Clearance of Trees, Bushes, Scrub, etc.

The contractor shall unless otherwise directed cut down all trees remove bushes, plantations, crops and other vegetable growth and grub up all roots, take down all huts, buildings, wall fence and any other obstruction and handle and transport salvaged usable materials, to a site approved by the Engineer. All salvaged and usable materials are the property of the respective owners. The clearing and demolition here-in described shall be carried out to a width of the minimum excavation plus 1.50 m on either side.

With exception of the salvaged material fore-mentioned, the Contractor shall destroy or otherwise remove the whole of the rubbish from the site to an approved tip or number of tips provided by him.

Trees shall be cut down to as near the ground level as possible and the rate entered in the Bill of Quantities shall include for cutting down, removing branches and foliage, cutting into suitable lengths, grubbing up stumps and roots, stacking up, burning or disposing off as directed.

Before commencing any site clearance, general clearance, clearance of pipelines etc., the contractor shall inform the Engineer's Representative of his intention. The Engineer's Representative will by visiting the section of works concerned, determine the extent of the clearance expressly required.

Payment for clearance will be authorized on the basis of what is expressly required and at the discretion of the Engineer's Representative.

1.2 Damage to Land, etc.

Except where necessary for the proper execution of the Works, the Contractor shall not interfere with any fence, hedge, trees, land or crop forming the boundary of the site, or elsewhere. In the event of any interference, the Contractor shall make good any damage to such fence, hedges, trees, land or crop to the satisfaction of the Engineer and the owner thereof.

Where the work is to be executed in private land, the Employer will be responsible for negotiating and obtaining rights of way and the serving of all notices as may be required upon the owners and/or occupiers of the land and it shall be the obligation of the Contractor to keep the Employer and the Engineer fully informed concerning the rate of progress and of his intention to enter and begin work with any way leave as provided for under the Conditions of Contract and required by this Specification.

1.3 Clearing the Site on Completion

On completion of the Work, the Contractor shall clear the Site of all plant, building, spoils, dumps, rubbish, etc. and leave the Site to the satisfaction of the Employer.

Borrow pits and temporary quarries shall be made good and covered with vegetable soil. Dumps for waste materials shall be covered with at least 0.5 m of soil of which at least a 0.1m layer in top shall be vegetable soil

2. EARTHWORKS SPECIFICATIONS

2. GENERAL

2.1 Method Statements

At least seven (7) days prior to the commencement of any open excavation at any section of the Works, the Contractor shall submit for the Employer's Representative's (Engineer's) approval, a statement of the excavation methods and procedures he intends to adopt on that section.

The statement shall include a description of the following, together with any other items which the Contractor considers relevant:

Sequence of operations; - A detailed programme of events and any consequent change in the overall programme of the Works;

Excavation protection and support, including drainage and temporary works; - Disposal or re-use of materials, including quantities and locations.

The methods adopted shall provide for the safe and efficient execution of the excavation work in such a way as to conform to the programme for completion of the Works and so that they do not interfere with other operations in progress of the Contractor or others.

The Employer's Representative's (Engineer's) approval of the Contractor's method of excavation shall not relieve the Contractor of any of his responsibilities or obligations under the Contract.

In the event the Contractor's methods do not provide results which satisfy requirements stated in the Specification, the Contractor will be obliged to change them and to use techniques and procedures

either agreed between the engineer and the Contractor or as indicated by the Engineer. Such changes will not warrant any extra payment to the Contractor.

2.2 Location and Shape of Excavation

The Contractor shall locate the excavations for structures and all other work as shown on the drawings and in accordance with the benchmarks provided to him by the Engineer.

The Contractor shall be responsible for correct location, and all extra work caused by his negligence in this matter will be at his expense and shall be corrected at the Engineer's request.

If local survey points or bench marks have been removed or are insufficient, the setting-out shall be related back to other established survey points or bench marks. Excavation shall be to the lines, grades and dimensions shown on the drawings or as established by the Engineer. During the progress of any open excavation work, it may be found necessary or desirable to vary the slopes or the dimensions of the excavations from those shown on the drawings or established by the Engineer. Such adjustment or trimming of the final excavated surface is considered to be a separate operation as defined hereafter.

Any and all over-excavation performed by the Contractor for any purpose or reason, except as may be directed by the Engineer, shall be at the expense of the Contractor. All such over-excavation shall be backfilled with approved material from excavations or concrete as directed by the Engineer, and the cost of furnishing and placing this backfill or concrete shall be at the expense of the Contractor.

The Engineer may direct alternative measures of backfilling, and the cost of such measures shall be at the expense of the Contractor.

Any other excavation performed at the option of the Contractor to secure access to required work, for disposal of material excavated, or for any other purpose, shall be at the expense of the Contractor.

2.3 Measurement of Excavated Volumes

The Contractor shall submit to the Engineer for approval the proposed surveying method for the measurement of excavated volumes not less than seven (7) days before commencing any such work. The proposed method shall take one of the following forms:

a) Contour Line Method

Maps defining the ground surface before the commencement of excavation works shall be prepared. Immediately after a change of type of work or classification of material and after completion of any excavation, the Contractor shall take survey measurements to define the dimensions and elevations of the corresponding excavated surface. Measurements shall be taken with a tacheometer with a minimum density of points of one per 20m². From these measurements, sets of contour lines shall be prepared for each successive surface, e.g. original ground, rock final and excavated surfaces, and all sets shall be presented on a single plan. From this plan, the measurement of excavated volumes shall be calculated by an analytical method and checked by means of a planimeter.

b) Average Section Method

Profiles shall be taken by the Contractor of the ground surface before commencement of excavation, immediately after a change of type of work or classification of material and after completion of any excavation. Measurements shall be taken by means of a tacheometer or leveling instrument in order that vertical sections may be prepared at intervals of 3.0m or as directed by the Engineer. The volumes of excavated material shall be calculated between adjoining sections by considering the average area of the two sections over the intermediate distance. In the case of a curvilinear area, the profiles shall be measured radially. Volumes of excavated material shall be calculated for the cross-sectional area of

each profile. The distance over which this area shall be considered is the length of the arc, passing through the centre of gravity of the section, subtended by the angle between the radial sections. Measurements, which are to be the basis of quantities for payment, shall be taken in the presence of the Engineer.

The Contractor shall give notice of his intention to take such measurements not less than twenty four (24) hours beforehand.

2.4 Classification of Excavated Materials

Separate measurements shall be made for bulk and trench excavation classified either as "common excavation" or "rock excavation". At the commencement of any excavation operations at each location of each section of the Works, the Contractor shall establish and agree with the Engineer the separate classification and their limits.

Subsequent modifications to these limits may be made during the progress of the Works in accordance with actual conditions as encountered, but such modifications will only be agreed when the materials are exposed.

Whenever an agreement is not possible on the classification of the material exposed in a certain area, a ripping test, in the form described below, shall be performed by the Contractor at his own expense at the area considered, in the presence of the Engineer.

The ripping test shall comprise:

- (a) a survey, on a 1.0 m grid, to establish cross-sections over a test area of not less than 10 x 4 m within the area to be classified;
- (b) provision of a Caterpillar Model D8K tractor or equivalent machine, equipped with a single straight ripper tooth 110 m penetration, hydraulically operated and approved by the manufacturer for use with the D8K;
- (c) Ripping of test area with two passes per meter of width, with the full load applied to ripper tooth;
- (d) After ripping, removal of ripped material by loading machine of approved type;
- (e) Re-survey of the cross-sections and calculation of the volume and equivalent depth of excavation.

Common excavation for the purposes of measurement and payment shall be defined as:

- (a) All materials excavated without prior visual inspection and classification by the Engineer;
- (b) All material that gives an equivalent depth of excavation equal to or more than 0.25 meters in the ripping test;
- (c) All non-rippable boulders, or detached pieces of solid rock, embedded in common excavation material, but each having a volume of less than one cubic meter or a weight of less than two tonnes.

Rock excavation for the purposes of measurement and payment shall be defined as:

- (a) All material so classified by visual inspection and agreed with the Engineer.
- (b) All material that gives an equivalent depth of excavation less than 0.25 meters in the ripping test;
- (c) All non-rippable boulders, or detached pieces of solid rock embedded in common excavation, each having a volume of more than one cubic meter or a weight of more than two tonnes.

2.5 Dewatering

The Contractor shall be responsible for the protection of all sections of the Works from effects of surface water run-off and ground water.

Such protection shall include pipes, channels, embankments and pumping arrangements to keep the Works free from any water which may damage the finished quality or impede progress or inspection during construction.

Where local streams or natural drainage channels intersect the Site of the Works, these streams and channels shall be diverted outside the limits of the Works, at the expense of the Contractor.

The Contractor shall be responsible for the design of all such temporary dewatering works, and shall on request, provide the Engineer with drawings, calculations, explanatory reports and any other evidence that their performance will be adequate for their purpose.

Where some part of the Permanent Works can be adopted for such dewatering, the Engineer will instruct the Contractor on any limitations he requires with respect to their temporary use for dewatering during the construction of the Works.

3. TYPES OF EXCAVATION

3.1 General Clearing

General clearing comprises the removal and disposal of all trees, shrubs, buildings, fences and similar matter from the areas shown on the drawings or as directed by the Engineer.

The areas to be cleared shall include the foundation areas to all parts of the Works.

The limits of general clearing shall extend 5m beyond the toe of the fills and the limits of excavation, except where otherwise directed or indicated on the drawings.

Timber may be retained and used on Site by the Contractor. Unsuitable material shall be removed directly to an approved disposal area.

3.2 Stripping

Stripping shall consist of the removal from the surface and disposal of all humus, stumps, roots, brush, rubbish, other vegetation matter, and perishable and undesirable materials generally to a depth of 0.5m or as otherwise directed by the Engineer.

Stripping work shall include the transporting and disposal of stripped material.

The limits of stripping shall extend at least 3 m beyond the toe of fills and limits of excavation, except where otherwise directed or shown on the drawings.

3.3 Bulk Excavation

Bulk excavation comprises the open cut excavation to be performed to lines, grades and dimensions shown on drawings or as directed by the Engineer.

The method adopted shall be suitable for the types of material encountered, to provide for the work to progress in an orderly manner and to restrict over-excavation to a minimum.

Within 3 m of the levels shown on the drawings, the Engineer may direct the excavation in successive stages until a suitable foundation or surface, as determined by the Engineer, is reached.

The Contractor shall not be entitled to any additional payment above the unit prices for the excavation by reason of such successive stages in the excavation procedure. Each successive stage shall include sufficient cleaning to enable the Engineer to inspect the foundation in order to direct further excavation if required.

Loose excavated material shall be removed from the excavation as the work proceeds and shall be transported to the disposal area or stockpile as directed.

For the final preparation of slopes and foundations, the Engineer may direct that the last 20 cm of the excavation, whether in common material or rock excavation, shall be excavated without the use of explosives or ripping, and such excavation methods will not be considered for separate payment, since they shall be deemed to have been already included in the unit prices for excavation work.

For the Emergency Spillway, excavation shall be carried out by such methods that shall not in any way disturb the condition of the adjacent existing spillway and dam.

3.4 Trench Excavation

Trench excavations shall be defined as those whose final width is less than 2 meters, or greater than 2 meters when depth is greater than width.

Excavation for trenches (including pits, footings, etc.) shall be performed by the use of hand tools and approved mechanical equipment in such a manner as to prevent shattering of the sides and bottom of the excavation. At the option of the Contractor, and with the approval of the Engineer, blasting may be carried out in accordance with Sub-section 3 hereafter. All planking, strutting and supports necessary to retain the sides of the excavation shall be provided, erected and maintained in a safe condition by the Contractor.

3.5 Slope Adjustment and Trimming

If, during the progress or after completion of bulk or trench excavations in common material, the Engineer instructs the Contractor to modify or extend the slopes or dimensions of the excavation by a horizontal width of less than 5 m, such modifications or extensions will be considered as separate excavation operations defined as "slope adjustment" or "trimming".

Modifications or extensions of more than 5 m will be considered and paid for as bulk excavation. - Slope adjustment shall apply where the modification or extension involves the adjustment of the limits of the bulk excavation by additional excavation of a horizontal width of more than 1 m up to 5 m. - Trimming shall apply where the adjustment to the bulk excavation limits is required by a thickness of additional excavation of less than 1m.

3.11 Seams and Cavities

The assumed lines of excavation shown on the drawings shall not be interpreted as indicating accurately the final or actual excavation lines.

There may be depressions, fissures, faults, seams and bands of soft disintegrating material running in various directions in the materials to be excavated and in the foundations, slopes and other areas.

Where defects occur they shall be made safe by supports or corrected by local excavation below the general surface of excavation to the lines, depths and dimensions directed by the Engineer.

4. DISPOSAL AND STOCKPILING AREAS

The Contractor shall maintain appropriate disposal areas in the locations shown on the drawings, or as otherwise approved, for materials unsuitable for fill or aggregate production, surplus material from excavation and other approved waste.

All debris, bush, roots and other combustible material shall be burned or buried. All non-combustible waste shall be buried. Disposal by burying shall be done in such a manner that the material disposed of is buried with a minimum cover of 50 cm of excavation spoil or stripped material. The Contractor shall at no time leave a fire unattended and shall be responsible for any fire damage resulting from his operations.

Should the Contractor wish to form spoil dumps for his own convenience, other than those described, he shall obtain the Engineer's approval before any dumping is started.

Where excavated materials are suitable and are required for use in subsequent work, the Engineer may direct that these are separately stockpiled and will designate the location for such stockpiles within the disposal areas or in separate locations adjacent to the sites of the Works.

Adequate road access to the disposal and stockpile areas shall be established and maintained by the Contractor. Disposal and stockpile areas shall be cleared in accordance with Sub-section 2.1, and drainage channels shall be formed to remove surface water.

The tipping of materials in disposal or stockpile areas shall be controlled to provide a uniform and progressive use of the area, and tipped material shall be spread and graded to form layers of not more than 1 m thickness.

On completion of the Works, the disposal and stockpile areas shall be left in a tidy and safe condition to the satisfaction of the Engineer.

5. BACKFILL

The Contractor shall supply, place and compact backfill or selected material in trenches and around concrete structures as shown on the drawings or as directed by the Engineer.

No backfilling shall commence until the foundation and Permanent Works have been inspected and approved by the Engineer.

Backfill shall be placed and compacted in successive layers not exceeding 25 cm in thickness. Compaction of cohesive soils shall continue until the dry density of the material reaches a value of 90% of the AASHTO maximum dry density, as determined in accordance with BS 1377.

The compaction of granular soils shall continue until the dry density of the material reaches a value of not less than 80% of the relative density as determined in accordance with Test 12 of U.S. Bureau of Reclamation Earth Manual (Section Edition, 1974).

In the event of any damage to any structure as a result of the placing or compaction of backfill, the Contractor shall repair the structure at his own expense, to the satisfaction of the Engineer.

6. CONCRETE WORKS

6.1 All materials and workmanship for concrete shall comply with BS 8110 and BS 8007 where applicable.

6.2 Materials and Tests.

6.2.1 Cement

Cement shall be ordinary Portland cement complying with BS 12. The cement shall be delivered in properly sealed, unbroken bags.

Rapid hardening Portland cement complying with BS 12 may be used with the approval of the Engineer.

Quantities in excess of one ton shall be stored in a water-proof shed with a raised floor. The cement shall be used in the order in which it has been received.

Quantities of less than one tonne for early use may be stored on a raised floor and covered by water-proof tarpaulin.

Any cement damaged by water or proving defective shall be removed from the site immediately.

6.2.2. Aggregates for Concrete

The aggregates shall comply in all respects with the requirements of BS 882.

The aggregates shall be free from dust, decomposed material, clay, earthly matter, and foreign substances or friable, then or laminated material. The fine aggregate shall be of approved river sand.

Coarse and fine aggregates shall be stored on the sites in separate heaps so that no possibility of any intermixing of the two shall occur. Any materials, which have become intermixed, shall be removed by the Contractor forthwith.

A sample of all aggregates shall be delivered to the site for the approval of the Engineer, and it shall remain on the site until all concrete work is finished.

Should the Engineer so require, the Contractor shall furnish a certificate from an approved testing laboratory in connection with each source of fine and coarse aggregate showing that materials comply with the specification. All such testing shall be carried out at the Contractor's expenses.

6.2.3 Water

All water to be used for concrete, motor and curing shall be of good drinkable quality, free from humus acid, chemicals, salts or other matters that in any way whatsoever may be harmful to the concrete either by diminishing the strength or causing a discoloration of the concrete.

Generally, water from Public mains shall be used, but if this is not possible, the contractor shall obtain water from other sources approved by the Engineer. The Contractor may be requested to provide test analysis according to BS 3148 from an approved laboratory.

6.2.4 Admixture

Admixture of any kind of accelerating the setting of cement, plasticisers, water proofers, etc. shall not be used except by written permission of the Engineer. The Contractor must request supply all details of any admixture.

6.2.5 Concrete Mixture

Concrete shall be "Designed Mixes" for reinforced concrete and "Nominal Mixes for mass Concrete" to BS 8110 and used as shown on the drawings and in the Bills of Quantities. The concrete mixes,

maximum aggregate sizes, maximum water/cement ratio and minimum cement content shall be in accordance with the following table.

Concrete Grade	Maximum size of Coarse Aggregate	Minimum Cement Content kg/m ³	Maximum Water/Cement Ratio
10	40	210	0.5
15	40	250	0.5
20	20	350	0.5
25	14	390	0.5

6.2.11 Trial Mixes

The actual concrete mixes shall be determined prior to starting of concrete works according to BS 8110.

For each grade of concrete three separate batches shall be made using the actual aggregates

The workability of each of the trial batches should be determined and two times three cubes made from each batch for test at 7 days and 28 days.

The average strength of the nine cubes shall exceed the following values

Concrete grade	Minimum average of 9 cubes At 7 days	Minimum average of 9 cubes at 28 days
20	21 N/mm ²	31.5N/mm ²
25	24.5N/mm ²	311.5 N/mm ²

For the trial mixes the mix proportions shall be specified under clause 11.3 of BS 8110.

6.2.7. Testing of concrete shall comply with BS 8110

All test cubes shall be manufactured, cured and tested as detailed in BS 1881.

The Contractor shall provide at his own expense all the necessary labour, equipment, moulds, transport, etc., required for manufacture of the test cubes. All test cubes requested by the Engineer shall be tested by Ministry of Works, Materials Branch, and the contractor shall allow in his rates for concrete for all costs in relation with the test cubes.

Should the Contractor require independent tests, he shall make them at his own expense, and the results of such tests shall not be valid unless test cubes are manufactured in the presence of the Engineer and tested by an approved agency and to the requirements in all details of the BS mentioned above.

Sufficient moulds and equipment shall be provided to enable a minimum of six test cubes to be prepared on each day when concrete is being mixed or such other number as the Engineer may direct.

The Contractor shall be responsible for delivery of the test cubes to the Ministry of Works, materials Branch, or other approved testing laboratory.

The precise location of the concrete, which the test cubes represent and the time of Placing, shall be noted on the drawings or elsewhere.

Where the concrete in the work is compacted by mechanical vibration, the test cubes shall be compacted by mechanical vibration, and where the concrete in the work is compacted by hand, the test cubes shall also be compacted by hand as specified in BS 1881.

The Engineer may in the Laboratory make test cubes for any purpose from site materials, and the contractor shall supply such materials as required free of charge.

The test cubes shall be store at the site of construction at a place free from vibration under damp sacks for 24 hours after which time they shall be removed from their moulds, marked and buried in damp sand or under water until the time for delivery to the testing laboratory.

The cubes shall then be placed in damp sand or another suitable damp material and sent to the testing laboratory, where they shall be similarly stored until the date of test. Test cubes shall be kept on the site for as long as practicable but for at least three-fourths of the period before testing, except for tests at ages less than seven days.

6.28 Standards for Acceptance of Cube Tests.

The results of all cubes shall be accepted by the contractor and Engineer as true results of the crushing strength of the cubes. The cube strength shall be calculated from the maximum load sustained by the cube at failure.

The appropriate strength required may be considered to be satisfied if the requirements in BS5328 : Part 4, clause 3.111, are fulfilled.

If the tests fail to give the required strength, further testing of the concrete shall be carried out. If these tests fail to prove the strength of the concrete used, the contractor shall at his own expense remove and replace all such concrete as directed by the Employer.

6.2.9 Slump Tests

Concrete consistency shall be determined by a test carried out in accordance with BS 1881 and at the Contractor's expense. Unless otherwise specified by the Engineer, the following are the slumps for the particular class of work.

	Compaction by vibrator	Compaction by hand
Reinforced concrete		30 to 110mm
Mass concrete	0 to 30 mm	30 to 80mm

Concrete having a slump test value exceeding the values here-in specified may be rejected by the Engineer.

6.2.10 Steel Reinforcement

Steel for reinforced concrete shall be store under cover clear of ground and shall comply with BS 4449, BS 44111 and BS 4483

All steel reinforcement shall be supplied by and approved manufacturer, and the Contractor may be required to obtain a manufacturer's test certificate in respect of steel reinforcement supplied. In the absence of such a test certificate, the Contractor may be required to submit samples to be tested at the Contractors expense in such a manner as the Engineer may determine.

6.3 Precast Concrete Units

Precast concrete shall be cast in properly made strong moulds true to the shape required. For work described "Finished Fair" the moulds shall be lined hardboard, sheet metal or other approved material.

The Concrete shall be thoroughly tamped in the moulds and shall not be removed from then until 7 days after placing the concrete, but the sides may be removed after 3 days, provided the moulds are such that the sides are easily removable without damaging the concrete.

The precast work shall be cast under sheds and shall remain under same for 7 days in the moulds and further 7 days after removal from the moulds. During the whole of this period the concrete shall be shielded by sacking or other approved materials kept wet. It shall then be removed from the sheds and stacked in the open for at least 7 days to season.

All precast work shall be cast in lengths convenient for handling unless otherwise described.

Prices are to include for handling reinforcement, hoisting, fixing and bedding in cement mortar, and for finishing exposed surface fair where described.

6.4 Workmanship

6.4.1. Inspection of Reinforcement and Formwork

No concreting shall commence until the reinforcement and formwork have been inspected and approved by the Engineer, Reinforcement in walls and columns shall be inspected and approved before being enclosed in the formwork. Before concreting any part of the Work, the Contractor shall give at least 24 hours notice in writing to the Engineer and obtain his approval.

6.4.2 Mixing of Concrete

Concrete for grade 20 and grade 25 shall be mixed by weight batching only, unless approval has been obtained from the Engineer for the concrete materials to be mixed by volume. Concrete for grade 10 and 15 can be mixed by volume.

The weight of coarse and fine aggregates in each batch shall be so computed that each batch contains one or more full 50 kg bags of cement.

All concrete is to be mechanically mixed in a batch mixer of an approved type. The dry materials for concrete shall be mixed in the mixer until a uniform colour is obtained after which the gauged quantity of water shall be gradually added. After all the water has been added, the mixer shall continue to mix for a period of not less than two minutes.

The mixers shall be equipped with an adjustable device capable of supplying a predetermined amount of water.

On the completion of each mixed batch of concrete, the mixer drum shall be completely emptied before a fresh batch is placed therein. On the cessation of work, the mixer add all handling plant shall be washed out and shall always be left clean and free from hardened concrete.

Any mix considered to be unsatisfactory by the Engineer for any reason, will be discharged to waste at the Contractor's expense, as and where directed by the Engineer, well clear of all mixed and placing operations in such a manner as to avoid the risk of defective concrete being incorporated in the Works.

The mixer shall be maintained in a first class condition throughout the Contract and any mixer or plant, which is faulty in any respect, shall not be used. The drums of all mixers shall revolve at the speed recommended by the makers. A mixer which has been out of use for more than 20 minutes shall be thoroughly cleaned out before any fresh concrete is mixed.

The Contractor shall always have one spare mixer ready on the site to avoid interruption in the mixing a casting of concrete.

6.4.3 Transport and Placing of Concrete

Concrete shall be transported in a manner which will avoid a segregation of the constituent material, and placing in the forms shall be completed before the concrete has taken its initial set. In no case shall concrete be placed in the Works more than 30 minutes after mixing. Concrete shall not be dropped through a height greater than 1.2m. Chutes may be used if they are constantly kept free from coatings of hardened concrete or other obstructions. Pumping of concrete through delivery pipes may be used, but only with the prior approval of the Engineer.

Concrete of any unit or section of the work shall be carried out in one continuous operation, and no interruption of the concreting will be allowed without the approval of the Engineer

The concrete shall be placed in layers as directed by the Engineer over the whole area to be concreted and the second layer shall not be commenced until the first is completed. Sloping beds will not be allowed when placing concrete. Should any accidental segregation occur, the affected area shall be thoroughly turned over by hand until a homogeneous mix has been obtained.

When concreting walls and columns, the mix proportions of the first 250mm depth of concrete placed in contact with the horizontal joint should be adjusted by reducing the amount of coarse aggregate.

6.4.4 Compaction

After the concrete has been placed in a position it shall be compacted by vibration with a rigid poker type with internal vibrator approved by the Engineer. The Concrete shall be worked well up against the form, joints and around the reinforcement and be free from voids and other imperfections. Under no circumstances shall the concrete be shifted or transported inside the form with vibrator.

The Contractor shall always have one spare vibrator ready on the site to avoid interruption in the mixing, casting and vibrating of concrete.

In the case of reinforced concrete, a competent steel fixer shall be in constant attendance during the placing of concrete to adjust and correct the position of the reinforcement, if so required, immediately before the concrete is placed. In no case shall the vibrators be attached to or be allowed to come into contact with the reinforcement.

Each freshly placed layer of concrete must be thoroughly compacted and worked into the preceding one but care shall be taken that no damage is done to previous work that has already set. Excessive compaction of concrete shall be avoided.

The upper surface of slabs shall be compacted by an approved external vibrator.

6.4.5 Placing of Concrete under Water

Concrete shall only be placed under water with the prior approval of the Engineer who shall likewise approve the method to be used and the precautions necessary to prevent loss of material. In no circumstances shall concrete be dropped or placed in water in a loss condition or be placed in flowing water. In all cases the cement content shall be increased by 25 per cent for each class of concrete at the Contractor's Expense.

6.4.6 Placing of Concrete on Earth Surfaces

Earth surfaces on which concrete is to be placed shall be clean, firm and free from standing or flowing water. After the excavation has been completed to the approved lines levels and

6.4.7 Construction and Expansion Joints

The position and arrangement of construction and expansion joints shall be as shown on the drawings. Where additional joints are requested, the positions must be approved by the Engineer.

All construction joints shall be rebated to form a key with subsequent work. Concreting of any unit or section of the work shall be carried out in one continuous operation up to construction joints and no interruption of the concreting will be allowed without approval.

Where shown on the drawings construction and expansion joints shall be provided with water bars of P.V.C. or other approved material. The widths and shapes of the water bars shall be as specified on the drawings and all joints shall be sued. The trade mark of the water bars shall be approved by the Engineer before commencement of work, and fixing and jointing of water bars shall be approved by the Engineer before commencement of work, and fixing and jointing of water bars shall be approved by the Engineer before casting.

The fusing of water bars shall be performed in a way so as to secure that the two bars joined over the entire width. The fused joint shall be able to withstand tension and shall be intact after 10 consecutive bending. The Engineer may request that the fusing is carried out by specialists.

Where shown on the drawings, joints shall be provided with a joint sealing compound. The sealing compound shall be a two component polysulphide rubber sealing compound complying with BS 4254, and the trade mark shall be approved by the Engineer. The compound shall be placed in a chase made by a fillet strip in the formwork. The concrete shall be dry and suitable primer shall be applied to the joint before applying the sealant. The procedure for the workmanship shall be approved by the Engineer before commencement of work, but the contractor shall have the full responsibility for the water tightness of the joints.

It should be noted that the lower part of the concrete walls shall be cast together with the floor slab and no joint directly on the slab will be permitted.

Before depositing fresh concrete against concrete which has already set, the face of the latter shall be roughened to expose the coarse aggregate, all cement latency removed whilst the concrete is still green and the surface thoroughly wetted with water and cleared of foreign matter. Cement mortar grout mixed in the proportion of one part of cement to two parts of sand shall be spread to a thickness of 5 mm over the face of the set concrete before the fresh concrete is deposited.

6.4.8 Curing and Protection of Concrete

Curing shall begin as soon as the surface of the concrete has hardened sufficiently. All exposed concrete surfaces shall be cured for a period of seven days by covering them with a layer of sand,

hessian canvas or other approved materials kept damp. Concrete shall be protected from sun, wind, heavy rains and flowing water for at least three days after placing.

6.4.9 Finishes of Horizontal Surfaces

Concrete surfaces for floors shall be true to level and falls as shown on the drawings. Water coming to the surface when vibrating shall be removed. After casting the surface shall be smoothed with a wooden flat. After some hours, when the surface has dried up, the surface shall be trowelled smooth with a steel trowel.

All other horizontal surfaces shall have the same surface finish except for the final trowelling with steel trowel.

6.4.10 Finishes of Vertical Surfaces

The shuttering for exposed concrete faces shall be so constructed that the latter shall be true to line and surface. The concrete shall be consolidated as specified against the shuttering to keep the face of the work free from honeycombing and other blemishes.

After removal of the shuttering, no concrete surfaces shall be treated in any way until they have been inspected by the Engineer.

If upon removal of the shuttering, the line or surface of the work is, in the opinion of the Engineer, unsightly and not in accordance with the requirements of the Contract, the Contractor shall at his own expense cut out and make good such portions of the work as the Engineer directs.

Rendering over defective surfaces shall not be permitted. Areas of honeycombing shall with the approval of the Engineer be made good immediately upon removal of the shuttering, and isolated superficial air and water holes shall be filled. Care shall be taken not to leave mortar or cement on parts of the surface which have been cast smooth and without pores.

Unless otherwise instructed, the face of exposed concrete placed against shuttering shall after removal of the shuttering be rubbed down with a carborundum stone or in other approved manner to remove fins and other irregularities, and washed perfectly clean.

Concealed concrete faces shall be left as from the shuttering, except that surfaces with honeycombing shall be made good.

6.4.11 Accuracy of Finish

The arrangement of all formwork shall be made in such a way that all dimensions shall comply as exactly as possible with those given on the drawings. The following tolerances shall be respected:

Foundations	50mm
Position of columns and Walls	5mm
Thickness of walls	5mm
Lateral dimensions of columns	5mm
Level of slabs,	5mm
Slab thickness	5mm
Lateral dimension of beams	5mm
Plumb of columns and walls	3 mm in each storey(non/accumulative)
Window and door opening sizes 5 mm	5mm

Surfaces and edges must not show any noticeable warping. On a length of less than 10 m the deviation may be 10 mm at the most.

The Contractor shall be responsible for the cost of all corrective measures required by the Engineer to rectify work which is not constructed within the tolerance set out above.

6.4.12 Construction of Formwork.

All formwork shall be substantially and rigidly constructed of timber or steel or pre-cast concrete or other approved material and shall be true to the shape, line, level and dimensions shown on the Drawings.

Timber shall be well seasoned, free from loose knots and or Formwork of exposed concrete faces be planned to thickness. Faces in contact with concrete shall be free from adhering grout, projecting nails, splits, or other defects that will make the concrete surface. Formwork for foundations and other concealed work may be undresses or rough timber.

All joints shall be sufficiently tight to prevent leakage of cement grout and to avoid the formation of fins or other blemishes, and all faulty joints shall be caulked.

All formwork shall be thoroughly cleaned and coated with an approved type of oil before it is fixed in position. Immediately before concreting the formwork shall be watered thoroughly and washed out to remove sawdust, shav or other rubbish. Where the appearance of the concrete face is important, the position and direction of the joints shall be as directed.

Fillet strips shall be fixed in the formwork to form a chamfer 20 mm by 20 mm on all external corners of the concrete.

Openings for inspection of the inside of the formwork for walls, beams and similar work and for the escape of wash water shall be formed in such a way that they can be conveniently closed before starting to place the concrete.

Connections between formwork elements shall be constructed to allow for easy removal of the formwork, and shall be either nailed, screwed, bolted, clamped, braced or otherwise fixed securing a sufficient strength to retain the correct shape and line during compaction of the concrete.

Bracing members placed in the formwork to keep two sides of formwork in exact position shall be approved by the Engineer. Holes in the concrete after bracing arrangement shall be made good by plugging with approved material.

Top Formwork shall be provided to concrete faces where the slope exceeds 1 vertical to 2½ horizontal. Such formwork shall be counterweighed or otherwise anchored against floating.

The formwork shall be so designed that the formwork for soffits of slabs and for sides of beams, columns and walls may be removed first leaving the formwork for the soffits of beams and their supports in position. Wedging or other suitable ways of adjustment shall be provided to allow accurate adjustments of the formwork and to allow a gradual removal of the same without jarring the concrete.

On demand the Contractor shall provide such drawings and calculations as necessary for determination of the structural strength of the formwork. The Engineer's approval of such drawings and calculations will not relieve the Contractor of his responsibilities under the Contract.

Formwork shall be erected true to line and braced and strutted to prevent deformation under the weight and pressure of the wet concrete, soffits shall be erected with an upward camber as shown on the Drawings or as directed by the Engineer or of 2 mm for each 1 m of horizontal span.

Re-propping of beams will not be approved except when props are reinstated to relieve the beams of loads in excess of the design load. Vertical props shall be supported on folding wedges on sole-plates, or other measures shall be taken whereby the props can be gently lowered vertically when commencing to remove the formwork.

If, in the opinion of the Engineer, the formwork is faulty, inadequate or does not comply with the specifications, then the Contractor shall at his own cost modify the formwork until it meets the approval of the Engineer.

6.4.13 Mould Oil

All faces of formwork that will come in contact with wet concrete shall be treated with approved mould oil or other coating to prevent adherence to the concrete. Such coatings shall be insoluble in water, non-staining, nor injurious to the concrete, shall not become flaky and shall not be removable by rain or wash-water. Liquids that retard the setting of cement shall only be applied to the shuttering when applied to the shuttering when approved. Mould oils and similar coatings shall be kept free from contact with the reinforcement.

6.4.14 Holes for Pipes, Cast-in Items etc.,

General

The Contractor shall be responsible for the co-ordination with the SubContractors for the setting out and fixing of all pipes and holes, pockets and chases for pipes. Sleeves provided by the sub-contractors are to be accurately set out and cast in and cutting away in completed concrete work is to be minimized.

Details of all holes etc. required in a structural work for services must be submitted to the Engineer who will assess the necessity for extra trimming reinforcement.

No openings, holes, chases, etc., are to be formed in the concrete without the approval of the Engineer and details of fixtures or fixings to be cast in must be approved.

6.4.15 Pipes through Water Retaining Walls

Pipes passing through water retaining walls and floors shall, wherever possible, be built into the structure in-situ. Shuttering shall be formed closely to the outside of the pipe, and concrete shall be placed and compacted thoroughly round the pipe.

Pipes, bolts or other steel items cast into the concrete in water retaining structures must not in a

When not possible to build in place, pipes shall pass through preformed holes. Holes shall be formed with formwork which shall be stripped cleanly and without shock to the concrete. As soon as the shuttering is stripped, the hole shall be thoroughly wire brushed to expose the aggregate. The hole shall be as neat as possible to allow the pipe to be passed through the wall, while the corners shall be chamfered or rounded.

The pipe shall be set and the hole filled up as soon as possible. Immediately before filling, the hole shall be continuously soaked so as to saturate the concrete, and the surface coated with a stiff mix of 1:1 sand grout. Shutters shall be fixed true to the faces of the wall, and a stiff mix of concrete packed in until the hole is completely filled, particular care to be taken to ensure that the spaces beneath the invert of the pipe and beneath the slopping soffit of the hole are completely filled. Shuttering shall be stripped as soon as possible and the filling rubbed smooth. The filling and the surrounding concrete shall be kept wet for 7 days after filling.

6.4.16 Removal of Formwork

Formwork shall be left in position until the concrete has attained sufficient strength to be self-supporting. The Contractor shall be responsible for the safe removal of the formwork without shock or vibration – which would damage the concrete.

Any work showing sign of damage through premature removal of formwork or through premature loading shall be entirely reconstructed at the Contractor's expense. The Engineer may delay the time of removal of formwork if necessary. Subject to the above, the minimum period for removal of formwork shall generally be as follows:

Slabs	Soffits (props left under	7 days
) “ “	Props	21 days
Beams	Sides	3 days
“ “	Soffits	21 days
Walls and Columns	s (unloaded)	2day

When formwork is removed after 3 days, it will be necessary to ensure that the exposed surfaces of the concrete are kept thoroughly wet for the period of curing.

6.4.17 Reinforcement

All bending, cutting and fixing to comply with BS 8110 and BS 441111. Normally Bending schedules are incorporated into the Contract Drawings, but the Contractor shall satisfy himself about their accuracy and about their complete coverage of the work involved. Any omission, inaccuracy or other errors observed by the Contractor shall be reported to the Engineer before commencement of the work.

In case of errors in Bending Schedules, no extra payment will be approved, provided the reinforcement is shown correctly on the Contract Drawings.

The number, size, shape and position of all the reinforcement shall, unless otherwise directed or permitted by the Engineer, be strictly in accordance with the drawings.

Bars shall be of the shown lengths, and lapping, except where indicated on the Drawings, is not permitted unless approved by the Engineer.

Spacing between bars shall not differ more than 5 mm from the required spacing. Any inaccuracy in the total length of a bar as cut shall be compensated for in the end hooks or other approved parts of the bar.

The internal radius of a bend shall neither be less than allowed by BS 441111 nor less the radius given in the Bending Schedule. The steel reinforcement shall be assembled and fixed in the form of a rigid case. To prevent displacement before or during concreting the bars shall be secured one to the other with approved binding wire at each intersection. In slabs and walls binding at every second intersection is sufficient.

Concrete cover blocks (mix 1:3) shall unless otherwise directed be used between the reinforcement, the bottoms and sides of the forms to ensure the specified concrete cover to the bars. Variations of cover shall be kept within plus/minus 3 mm from the specified cover.

The minimum clear horizontal distance between adjacent bars shall be of 25 mm or the diameter of the bars whichever is the biggest, and 25 mm vertically. Space bars shall be inserted at such intervals that the bars do not perceptibly sag. Projecting bars shall be adequately protected against displacement both during and after concreting.

At the time of fixing and when concrete is being placed, all reinforcement shall be free from oil, painting, grease, dust and scale or any other coating which would destroy and bond with the concrete. The Contractor must obtain the Engineer's approval of the reinforcement when placed, before any concreting is commenced.

7.0 MASONRY AND BLOCKWORK

7.1 General

All masonry work shall be constructed from building stone or approved concrete blockwork. For walls, facing and other exposed works the stone shall, unless otherwise specified, be medium chisel-dressed.

7.2 Workmanship

All masonry work is to be constructed in compliance with BS 5. The Contractor shall provide and use proper setting-out rods for all work. Stones and blocks shall be well soaked before use and the tops of walls shall be kept wet as the work proceeds. The stones and blocks shall be properly bonded so that no vertical joint in a course is within 115mm of a joint in the previous course. Alternate courses of walling at angles and intersections shall be carried through the full thickness of the adjoining walls. All perpend, reveals and other angles of the walling shall be built strictly true and square. The stones and blocks shall be bedded, jointed and pointed in mortar (1:3) with beds and joints 9mm thick flushed up and grouted solid as the work proceeds.

7.2 Cement

Cement used for making mortar shall be as described in the Engineering specifications for "Materials".

7.3 Lime

The lime for making mortar shall be obtained from an approved source and shall comply with BS 890 Class A for non-hydraulic lime. The lime to be run to putty in an approved lined pit or container. The water to be first run into the pit or container and the lime to be added until it is completely submerged, stirred vigorously until all lumps are disintegrated and shall be kept constantly covered with water and regularly stirred for at least four weeks. The resulting milk-lime then to be run through a fine sieve and run into a pit or other container and kept clean and moist for not less than two weeks before being used in the works.

7.3 Sand

Sand used for making mortar shall be clean well graded siliceous sand of good sharp hard quality equal to samples which shall be deposited with and approved by the Engineer. It shall be free from lumps of stone, earth, loam, dust, salt, organic matter and other deleterious substances, passed through a fine sieve and washed with clean water if so directed by the Engineer.

7.4 Water

Shall be as described in "Concrete Work"

7.5 Concrete Blocks

Concrete blocks shall comply with the requirements of BS 2028, 1384 except where amended or extended by the following clause. Blocks shall have square arises and corners. For fairfaced work damage to arises and corners shall not exceed the removal of 11 mm of the blocks depth or thickness. Concrete blocks shall have a minimum crushing strength of 3.5 N/mm² except when below the damp course level or in contact with soil when they shall have a minimum crushing strength of 7 N/mm², unless noted otherwise on drawings. Hollow concrete blocks shall not be used below the damp course level or in contact with soil.

Concrete blocks used for external walls shall be Class 'A' and for internal load bearing walls they shall be at least Class 'B'. Class 'C' blocks shall only be used for non-load bearing partitions.

No precast blocks shall be incorporated into the works unless approved by the Engineer. The delivery of present blocks from which samples tested do not comply with this specification shall be deemed defective. Any work constructed with blocks from which samples tested do not comply with this specification shall be deemed to be defective.

From every 1,000 precast concrete blocks delivered to site ten blocks samples shall be provided for testing. The precast block samples shall be selected in accordance with BS 2028, 13114. Samples of precast concrete blocks for testing shall be tested for the following properties in accordance with the methods given in BS 2028, 13114 and the test results shall comply with the requirements of BS 2018, 13114 except where amended by this specification:-

(a) Drying shrinkage (b) Compressive strength or transverse breaking load (as applicable) (c) Wetting expansion * (d) Density (e) Dimensional Tolerance (f) Cavity size

*Test only applicable for concrete blocks made with clinker aggregate.

Blocks shall also be tested to determine the suction rate. The test shall consist of weighing the block, placing in a tray of water such that only 3 mm of the block side is immersed for a period of sixty seconds +/- 2 seconds; quickly wiping off excess water and reweighing. The suction rate is the increase in weight due to water absorbed and shall not exceed 2kg/m²/minute. Blocks which have a suction rate exceeding 2kg/m²/minute may be used if the Contractor uses an approved water reactive additive in the mortar or can show that the blocks are wetted such that the blocks will have a suction rate not exceeding 2kg/m²/minute for a period of 24 hours from being laid and provided the blocks comply with all other requirements.

Concrete blocks shall be stacked on prepared dry areas free of clinker, ashes and sulphate bearing strata. Blocks of different strengths shall be stacked separately and clearly marked to differentiate the strengths.

Blocks shall not be used for a minimum of 7 days after manufacture and shall not be loaded for at least 14 days after laying. For the first 7 days after manufacture, blocks shall be cured by maintaining in a damp condition, e.g. covering with polythene sheeting after wetting blocks.

7.11 Stone

All stone shall comply with the requirements of CP 121.202 for masonry and rubble walls respectively except where amended or extended by the following clauses.

Unless otherwise noted, all masonry walls shall be coursed squared rubble walling with mortar joints. The size of stones for rubble walling shall be such that the length of stone does not exceed three times its height. For coursed squared rubble walls blocks shall not exceed 300 mm in height and shall be not less than 150 mm in height.

Where snecked rubble walls are specified, the snecks shall not be less than 100 mm square on the exposed face.

Stone for masonry shall have a minimum compressive strength of 10 N/mm². (Stone shall not be required to be tested to failure). The density of stone for masonry shall be not less than 2300 kg/m³. The drying shrinkage of stone shall not exceed 0.05%

Samples of stone provided for testing shall be tested for the following in accordance with the methods given in BS 2028, 13114 and the test results shall comply with the requirements of this specification.

(a) Compressive strength (b) Density (c) Drying shrinkage

The colour and texture of stone shall be uniform and consistent. Prior to delivering any stone to site, the Contractor shall supply the Engineer with a sample of stone in order that he may approve the colour and texture. The Contractor shall ensure that sufficient suitable stone is available for the whole of the project prior to ordering the stone.

Where cast stone including stone described as artificial stone, reconstructed stone, etc., is specified the stone shall comply with the requirements of BS 1217.

Masonry shall be of stone, having no irregular faces and only the back face if not visible shall be left as from the saw.

Prior to ordering dry stone the Contractor shall demonstrate that the stone is durable. This may be done by supplying details of buildings constructed with stone from the same quarry and which has been exposed to the same environmental condition for at least ten years.

The maximum projection from the face of stone for rubble walls shall be 20 mm beyond the specified face of the wall.

The Contractor shall provide six samples of stone measuring 150 mm x 150 mm for testing prior to delivering any stone to site. As work proceeds the Contractor shall provide six samples 150 x 150 x 150 mm for testing from every 300 m² of work.

All stone shall be stacked on prepared dry areas free of clinker, ashes and sulphate bearing strata.

7.7 Wall Reinforcement

100mm Thick walls and where described other walls and partitions shall be reinforced with a 25 mm wide strip of No. 20 S.W.G. hoop iron built into alternate horizontal joints in the wall centre. The reinforcement shall be lapped and hooked at running joints, angles and intersections and carried at least 115 mm into abutting walls at junctions.

5.8 Cement Mortar

Mortar described as cement mortar 1:4 shall be composed of 1 cubic metre (1498 Kgs.) of Portland cement and 4 cubic metres of sand. Other mixes such as 1:3, 1:5 etc. shall be similarly construed.

7.9 Mixing of Mortar

The constituent materials shall be measured separately when dry in specially prepared gauge boxes of sizes to give the proportions specified without consolidation of the contents by ramming and shaking. The mortar shall be mixed in an approved power driven mixer for not less than two minutes per batch and using the minimum quantity of water necessary to obtain a working consistency. The mixer shall be used as close as practicable to the works and mortar shall be used within 30 minutes of mixing. No partially or wholly set mortar will be allowed to be used or re-mixed.

7.10 General Construction

(a) Setting out The Contractor shall provide proper setting out rods and set out all work on same for course, openings, heights etc., and shall build the walls, piers etc., to the widths, depths and heights indicated on the Drawings and as directed by the Engineer.

(b) Building in Wood Frames Openings for doors, ventilators etc., are to be set out and left unbuilt until the wooden frames have been fixed in position.

(c) Building in Metal Windows and Doors Openings for metal frames are to be wide enough for the frames to fit without being forced into position. Build the lugs into the joints of the walling and fill in the space between the walling and frame with cement mortar well tamped into the channel of the frames and point all round externally.

All frames must be set plum and level and free from twist.

(d) Walls to Receive Plaster & Similar Finishes All faces of walls to be plastered etc., to have all projections dressed off and joints raked out as key.

7.11 Building Walling

(a) Laying and Jointing All blocks shall be well wetted before being laid and the top of walling where left off shall be well wetted before commencing building. Walls to be kept wet three days after building. All walls throughout the works shall be carried up evenly in 200 mm courses except where courses of less depth are required to bring walling up to level of floors, windows and the like and where otherwise described, no part being allowed to be carried up more than one metre higher at one time than any other part and in such cases the joining shall be made in long steps so as to prevent cracks arising and all walls shall be levelled round at each stage. Not more than 3 metre height of wall shall be laid in any one day.

(b) Bonding the blocks shall be properly bonded together and in such manner that no vertical joint in any one course shall be within 115 mm of a similar joint in the courses immediately above or below. All walling of 300 mm thickness or less shall be built in single thickness of blocks. Walling exceeding 300 mm in thickness shall be built with through bonders not more than 1070 mm apart in each course as directed by the Engineer.

Alternate courses of walling at all angles and intersections shall be carried through the full thickness of the adjoining wall. All perpend, reveals and other angles of the walling shall be built strictly true and square.

(c) Tolerances All courses of walls shall be level with a maximum deviation of +/- 3 mm in any one metre length and a maximum overall deviation of 10 mm for lengths of wall exceeding 3 metres.

Walls shall be plumb with a maximum deviation of +/- 3 mm in any metre height of wall with a maximum deviation of +/- 10 mm in the total height of the wall or any storey.

All corners of walls which are shown as being at right angles shall be square with a maximum deviation of 3 in 1000. All walls shall be straight with a maximum deviation of +/- 3 mm in any one metre length and a maximum overall deviation of 10 mm in any length exceeding 3 metres. All bed and vertical joints shall be an average of 10 mm thick with a maximum deviation of +/- 3 mm of blockwork, and stone rubble walls. Joints for stone masonry walls shall be 11 mm +/- 1 mm thick.

(d) Curing

All walls shall be maintained in a damp condition for at least 24 hours after laying. Walls under construction shall be dampened by applying water with a brush and no hosing directly on to the wall shall be permitted. When work ceases on any section of wall polythene or hessian shall be draped over the wall, for at least 24 hours. If hessian is used, it shall be maintained continuously wet.

(e) Backfilling

Earth backfilling against walls shall be carried out such that the level of the backfill is always equal on each side of the wall.

When a wall has filling material on one side only to a fill width of more than three times the wall thickness, the wall shall be continuously supported during backfilling.

Backfilling shall not be carried out until at least seven days have elapsed since the laying of the blocks or stone.

7.12 Reinforced Walls

Steel reinforcing bars in walls shall be carefully placed and spacers used to ensure that a minimum of 20 mm cover is given to the reinforcement unless otherwise specified.

Horizontal reinforcement in mortar joints shall be laid such that the reinforcement is not in contact with the blocks or stone.

7.13 Wall Ties

Wall ties shall be provided to connect walls to steel or concrete columns and beams to connect two unbounded leaves of wall.

Wall ties shall be provided at 450 mm centres both vertically and 900 mm centres horizontally and shall be staggered when used to connect two leaves of unbonded wall. Wall ties shall be embedded into each material by a minimum of 50 mm.

7.14 Fair Face

All concrete and hollow clay blockwork described as finished with a fair face is to be built to a true and even face with the joints finished as specified hereinafter.

7.15 Pointing

Pointing of walls shall be carried out as the work proceeds wherever possible. When coloured mortar is specified for pointing only the pointing shall be carried out after work has been completed. Existing walls shall be prepared for pointing by raking out all loose friable material to a minimum depth of 15 mm to form a square recess. The joints shall then be wetted and new mortar shall be forced into the joints and finished as directed.

7.16 Holes, Cutting and Chasing

(a) All putlog holes shall be not less than one course deep and carefully filled with a block cut to fit size of opening with beds and joints filled with mortar well tamped in after scaffolding is removed, and if in faced walls to match facing.

(b) Where walling is cut, holed or chased for conduits, pipes and the like all such cuttings etc., shall be filled in solid with cement mortar (1:4) prior to the application of finishes.

8.0 FINISHINGS

8.1 Samples

The Contractor shall prepare at his own cost sample areas of the paving, plastering and rendering as directed until the quality, texture and finish required is obtained and approved by the Engineer after which all work executed shall conform with the respective approved samples.

8.2 Finished thicknesses

The thicknesses of floor finishes quoted in this section of the specification shall be the minimum requirements.

The finished floor surface will equally have a constant level and any adjustment needed to achieve this effect with the varying floor finish materials is to be made in the screeds beneath the same.

Slabs bearing on the ground may be cast to varying levels, and be of constant thickness with varying formation levels, or have varying thicknesses at the option of the Contractor. This stipulation in no way relieves the Contractor of the requirements of the specification for structural work.

8.3 Materials generally

All materials shall be of high quality, obtained from manufacturer's to be approved by the Engineer. Cement, sand and water shall be as described under Concrete Work and Blockwork.

8.4 Bonding

Bonding compounds, etc., for use in applying plaster and similar finishes direct to surfaces without the use of backings or screeds are only to be used if approved by the Engineer and are to be used strictly in accordance with the manufacturer's printed instructions.

8.5 Chases, openings and holes

All chases, holes and the like which were not formed in the concrete or walling shall be cut, and all service pipes shall be fixed and all holes and chases filled with mortar before paving and plaster work is commenced. In no circumstances will the Contractor be permitted to cut chases, holes and the like in finished paving or plasterwork.

8.6 In situ finishing

8.6.1 General

The term plastering refers to the operation internally and rendering to the same operation externally but for ease of reference the term plastering has generally been used in this specification to describe both operations.

8.6.2 Mixes

The methods of measuring and mixing plaster shall be as laid down under Concrete Work and the proportions and minimum thickness of finished plaster shall be in accordance with drawing or bill of quantities. The following:-

To obtain greater plasticity a small quantity of lime may be added to the mixes for external plastering at the Engineer's discretion but in any case this is not to exceed 1/4 part lime to 1 part cement. With regard to the lime mortars gauged with cement, the addition just before use, of the cement to small quantities of the lime/sand mix shall preferably take place in a mechanical mixer and mixing shall continue for such time as will ensure uniform distribution of materials and uniform colour and consistency.

It is important to note that the quantity of water used shall be carefully controlled. Plaster may be mixed either in a mechanical mixing machine or by hand.

Hand mixed plaster shall first be mixed in the dry state being turned over at least three times. The required amount of water should then be added and the mix again turned over three times or until such time as the mass is uniform in colour and homogeneous.

The plaster shall be completely used within thirty minutes of mixing and hardened plaster shall not be remixed but removed from the site.

8.6.3 Preparation of surfaces for plaster etc.

Irregularities in the surfaces to be plastered or rendered shall be filled with mortar, without lime, twenty four hours before plastering is commenced. Joints in blockwork, etc., are to be well raked out before plastering to form a good key. Smooth concrete surfaces to be plastered shall be treated with an approved proprietary bonding agent or hacked to provide an adequate key for the plaster.

All surfaces to be plastered or rendered shall be clean and free from dust, loose mortar and all traces of salts.

All surfaces shall be thoroughly sprayed with water and all free water allowed to disappear before plaster is applied.

As far as practical, plastering shall not be commenced until all mechanical and electrical services, conduits, pipes and fixtures have been installed.

Before plastering is commenced all junctions between differing materials shall be reinforced. This shall apply where walls join columns and beams, particularly where flush, and similar situations where cracks are likely to develop and as directed by the Engineer. The reinforcement shall consist of a strip

of galvanised wire mesh 'Expamet' or equal approved 15 cm wide which shall be plugged, nailed or stapled as required at intervals not exceeding 45 mm at both edges. The surfaces to which such mesh shall be applied shall be painted with one coat bituminous paint prior to fixing the mesh.

8.6.4 Application of plaster and render

After preparation of the surfaces a key coat of cement slurry shall be applied to the wetted surface to be plastered. When this coat is dry the plaster coat shall be applied, by means of a trowel, between screeds laid, ruled and plumbed as necessary. This coat which shall be to the required thickness shall be allowed to dry and then cured as described. Surfaces are to be finished with a wood or steel float to a smooth flat surface free from all marks.

All plastering and rendering shall be executed in a neat workmanlike manner. All faces except circular work shall be true and flat and angles shall be straight and level or plumb. Plastering shall be neatly made good around pipes or fittings. Angles shall be rounded to 11 mm radius.

All tools, implements, vessels and surfaces shall be at all times kept scrupulously clean and strict precautions shall be taken to prevent the plaster or other materials from being contaminated by pieces of partially set material which would tend to retard or accelerate the setting time.

8.6.5 Curing of plaster

Each coat of plaster is to be maintained in a moist condition for at least three days after it has developed enough strength not to be damaged by water.

8.6.11 Angle beads

Where required by the Engineer, salient external angles of plastered walls shall be protected with galvanized mild steel angle beads complying with BS 12411 Fig. 7 Profile C3.

They shall be securely plugged, nailed or stapled as required at intervals not exceeding 450 mm at both edges.

8.6.7 Plaster stops

Where shown on details, plasterwork shall be stopped against "Expamet" galvanized steel plaster stop, reference 5115 which shall be securely nailed to walls in the positions indicated on the drawings.

8.6.8 Cement and sand screeds

Cement screed shall consist of cement and sand mix 1:2 laid in panels and finished with a steel trowel if not otherwise specified.

Where specified as waterproof "Puddlo" or similar waterproofing compound shall be added to the cement paving or screed strictly in accordance with the Manufacturer's instructions.

Where practicable, screed is to be laid while the concrete is still green. When this is not practicable, the concrete is to be well washed and brushed perfectly clean with a steel wire brush, to remove laitance and to give a roughened face as a key and then kept wet for at least seven days before the screed is laid. On the day of laying the surface is to be only damp with all surplus water removed and has to be painted with cement and sand mix 1:1 grout immediately before commencing laying of the screed. The grout is to be applied continuously in front of the screed, and not in large areas that will dry out before the screed is applied.

Screed shall be protected during the first stage of hardening from the harmful effects of sunshine, drying winds, rain or water. In exposed positions, the screed shall be covered with a well wetted layer

of sawdust, hessian or other approved material, and this layer shall be damp for at least seven days, during which period no traffic is to be allowed over the screed. Screeds shall be mixed and formed as described.

9. PIPEWORK

General

All pipes, couplings gaskets lubricants seals, coupling machinery etc; necessary for the proper construction of the pipe work as detailed in the Bill of Quantities and drawings shall be supplied by the contractor.

The contractor shall be responsible for ensuring that the pipes, couplings and other fittings laid or installed on each section of the work are of the standard and pressure classifications specified as appropriate to the circumstances, and are manufactured of the specified materials.

The Engineer reserves his right to refuse any materials that in his opinion is inferior.

The Engineer has the right to test any material upon delivery and materials found defective shall be replaced forthwith by the contractor.

If the contractor procures materials of different specifications in respect of flanges and threads etc, he shall at his own cost provide all adaptors and other fittings necessary to make connections to the satisfaction of the Engineer.

All materials shall be marked as specified in the relevant current British or ISO standards for easy identification.

9.1 Handling and Storing of Pipes and Fittings

The method of transportation, handling and storing of pipes and fittings shall be in accordance with the manufacturer's recommendations.

Pipes valves and other fittings shall be handled, moved, lifted or lowered with the least possible impact. Handling equipment shall be of approved type. In slinging pipes, only flat slings shall be used and the use of chain slings hooks or other devices working on scissors or grab principles shall not be permitted. Pipes shall be slung from two or more points as the Engineer may direct and the slinging, lifting and lowering shall be in the hands of a competent and experienced man.

Pipes storage shall be supported clear of the ground on approved supports adequately braced to prevent rolling. They shall not be stacked more than four tiers high without the approval of the Engineer. Materials of different classification shall be stored separately. All pipes and associated materials shall at all times be protected from sun and dirt to the satisfaction of the Engineer.

No valves shall be lifted by the spindle. Valves and other fittings shall not be stacked more than one tier high without the permission of the Engineer and they shall not be stored in a dirty place or condition.

Shortly before laying or fixing any valve, pipes or fitting the contractor shall in the presence of the Engineer or his representative carefully examine each valve, pipe and fitting to ascertain damage or defect occasioned to the valves, pipes and fittings during loading, unloading, handling, storage and transportation. All damage and all defects revealed by this examination shall be repaired and remedied by the contractor.

9.2 Laying and Jointing of Pipes

All laying and jointing of pipes except jointing of PVC and polythene pipes shall be in conformity with BS 13700 and BS 8010.

The bottom of the trench or surface of the bed shall be finished to a smooth even surface at the correct level to permit the barrel of the pipe to rest on the surface throughout its whole length between joint and sling holes. If considered necessary by the Engineer, fine-screened material shall be placed and consolidated in the trench bottom to provide such a bed. In general the preparation of the trench bottom and bed shall be completed for a length of one pipe in advance of the pipe-laying.

The bottom of the trench and pipe bed shall be inspected by the Engineer, and only when passed as satisfactory shall pipe-laying commence.

Each pipe shall be laid accurately to line, level and gradient so that, except where otherwise directed, the finished pipeline shall be in a straight line both in horizontal and vertical plans. The levels and gradients shown on the drawings shall be rigidly adhered to unless otherwise ordered by the Engineer.

Notwithstanding any flexibility provided in pipe joints, pipes must be securely positioned to prevent movement during and after the making of a joint. On screw and socket joints, threads shall be coated with an approved tape to ensure water tightness. The contractor shall take care that all pipes and couplings are clean and free of foreign matter before subsequent sections are jointed.

The contractor shall obtain from the manufacturer or other approved supplier the necessary tackle required for the proper jointing of the pipes. The contractor shall make himself and his employers acquainted with and comply with instructions issued by the manufacturers of the various types of proprietary joints and couplings for incorporation on the works. The contractor shall be responsible for obtaining copies of such instructions.

No person shall be employed on the jointing of pipes that is not thoroughly experienced and skilled in the particular work in hand.

Pipes shall not be cut without the permission of the Engineer. The cut shall be made with an approved mechanical pipe cutter and the edges of the cut shall be clean, true and square. Threading of steel pipes shall be done with an approved device.

Subject to the permission of the Engineer, pipes shall be covered over with approved fill material upon successful completion of laying and jointing. Joints shall be left exposed until completion of the test. The fill for surrounding and cushioning shall consist of uniformly readily compatible material free from tree roots, vegetable matter, building rubbish and excluding clay lumps retained on 75 mm sieve and stone retained on a 25 mm sieve.

The materials for bedding shall, where ordered, consist of suitable selected materials obtained from the excavations or from approved borrow pits and transported to the location where they are required. Upon successful completion of the pressure test the pipeline shall be back-filled as specified.

The contractor shall provide concrete indicator posts at every place where the change in class of pipe occurs with engraved marking on the post indicating class of pipe and direction.

The rate for pipework shall include for supplying, storing, handling, laying and jointing of pipes and is measured in linear metres. The rates shall also include for leveling of the trench bottom, compacting the foundation, and embedding the pipe together with the materials used for bedding all to the satisfaction of the Engineer.

9.3 Valves and Fittings

Unless otherwise directed all valves and other fittings and specials shall be individually supported and their weight shall not be borne by the pipeline joints or couplings etc. All supports for valves and fittings shall be of concrete grade 20.

Air valves shall be installed at high points in the pipeline as shown on the drawings. Before the valves are installed all the air nozzles shall be probed to see that they are clear. No air valves shall be stored before erection in the open in sunlight, or upside down to expose the balls and air cavities.

Scour valves shall be installed at low points in the pipelines as shown on the drawings. The contractor shall be in agreement with the Engineer on the exact position of scour valves in particular situations. Scour valves shall, where possible, discharge in the direction of natural drainage and at such a distance from the works as to preclude erosional effects.

Unless otherwise directed the controlling valve for a scour shall be installed not more than 1.5m from the main pipeline.

Ends of all scours shall be protected from intrusion of animals and other foreign matter by suitable screening securely fixed to the pipe end.

Valve penstocks and other fittings shall be securely fixed and where required extension spindles and headstocks shall be properly aligned and fixed in a vertical position unless otherwise directed.

Before each valve is put into service all gears bearings and spindles shall be oiled with approved oil as recommended by the valve manufacturers. All valves, fittings specials shall be fixed with proper sealing tape, gaskets, washers etc as necessary to the satisfaction of the Engineer. The valves shall be with non-rising spindle and shall if not otherwise stated be supplied with hand wheels.

The rates in the Bill of Quantities shall cover for the supply, storing, handling, installation and jointing, together with all bolts, washers, gaskets and lubricants, painting of all fittings with 2 coats of approved oil paints etc.

9.4 Flanges

Where flanged joints are used flanges shall be in accordance with the requirements of BS 4504: Part 1 or BS 4772. Where crewed joints are used, thread shall comply with BS 21.

The minimum pressure rating shall be for a working pressure of 1.0 N/mm² (approximately 100 metres head) corresponding to NP 10 flanges. The hydraulic test pressure shall not exceed 1.13 N/mm². Flanges in pipelines with higher-pressure rating shall be for the ratings specified in the Bill of Quantities.

Bolts nuts and washers shall comply with the requirements of BS 4190 and BS 4320. Gaskets shall fulfill the requirements of BS 2494 and shall have a minimum thickness of 2mm. The names of manufacturers and specifications of the products offered shall be provided at the time of tender.

9.5 Ductile Iron

Ductile iron pipes and fittings shall comply with BS 4772 or ISO 2531. The pressure rating of the pipes shall be for a minimum working pressure of 2.5 N/mm². Care should be taken when testing, not to exceed the permissible test pressure for the fittings installed.

Joints shall be either “Viking Johnson” or flanged joints as specified in the drawings and the bill of quantities.

Before any other joint is used written approval of the Engineer must be obtained. Pipes and fittings shall be coated inside and outside with a hot material complying with the requirements of BS 41134 or with cold applied material complying with BS 34113 type II material.

9.6 Grey Iron or Cast-Iron

Grey iron or cast iron pipes and fittings shall comply with BS 41322 or ISO/R13. The pressure rating of the pipes shall be for a minimum working pressure of 1.0 N/mm² (approximately 100 metres head) and a hydraulic test pressure of 1.13N/mm².

Joints, internal and external coatings to be as specified in clause 505, Ductile Iron.

9.7 Steel

Steel pipes and fittings shall comply with BS 534, BS 1387 or BS 361. Pipes complying with BS 1387 shall be of "Medium" or "Heavy" classes as specified in the Bills of Quantities and Drawings.

9.8 Unplasticised Polyvinyl Chloride Pipes

All uPVC pipes and fittings shall comply with KS ISO 1452-2:2009,

Pipes indicated with a pressure class shall conform to the following minimum working pressures:

PN 6 – 0.6 N/mm²

PN 8 – 0.8 N/mm²

PN 10 – 1.0 N/mm²

PN 12.5 – 1.25 N/mm²

PN 16 – 1.60 N/mm²

All fittings shall be of pressure class “PN 113” and be manufactured of cast iron, PVC or steel. Joints to be plain sockets for gluing with solvent cement for nominal sizes equal to or smaller than – 50mm and mechanical joints (Rubber ring) for nominal sizes equal to or bigger than – 90 mm.

For both types of joints the manufacturer’s jointing instructions must be strictly adhered to. PVC pipes and fittings shall be stored under cover, which fully protects the material from sunlight.

9.9 Precast Concrete

Precast concrete pipes and fittings shall comply with BS 5513: Part 2.

Minimum crushing test loads shall be as specified in Table 2, standard pipes. The laying and jointing of the pipes shall comply with BS 8301.

The contractor shall adopt such measure as may be approved by the Engineer to ensure that every newly laid pipe is concentric with previously laid pipes with which it joins.

Unless otherwise approved by the Engineer pipes shall be laid in an upstream direction and the socket ends shall point upstream.

9.10 Protection of Pipes

The concrete used for bedding, haunching and surrounding the pipes shall be concrete “Grade 10” unless otherwise ordered by the engineer. The concrete protection shall have total dimensions not less than given below:

(i) Bedding concrete shall have a width of at least 300mm bigger than the external diameter of the pipe and shall support at least the bottom quarter of the pipe circumference. It shall have a minimum depth of 150 mm measured under the pipe throughout.

(ii) Bedding and hunching shall comprise a concrete bed with a minimum width of 300 mm more than the external diameter of the pipe and a minimum thickness of 150 mm below the pipe, and haunching with a minimum thickness of 150 mm on both sides of the pipe. The top of the hunching is to be flush with the top of the pipe.

(iii) Surrounding concrete shall comprise a concrete be as described above together with 150 mm concrete on both sides and on top of the pipe, giving a pipe protection of at least 150 mm concrete everywhere around the pipe.

Concreting of bedding, haunching or surround shall not be done until the pipes have been jointed, inspected and tested.

PVC pipes shall be protected with polythene or roofing felt wrapping before concreting.

9.11 Testing of Pressure Mains

Pressure pipelines (together with all fittings and valves incorporated in the mains) shall, before being covered, be tested with water as specified in BS 13700.

At least two days notice must be given in writing to the Engineer before pressure testing is commenced.

9.12 Water Pressure Test

The water test pressure to be applied will be 1.5 times the nominal working pressure for the class of pipe being tested. The Engineer, however, reserves the right to alter this figure.

Main work shall be filled and tested in sections of convenient length which must not exceed 500 metres where pipes are laid with steep gradients the length of pipes tested at any time shall be as directed by the Engineer.

The ends of pipes under test shall be closed by means of caps or blank flanges provided by the contractor. Gate valves must not be used for this purpose. All scour valves and air valves shall be replaced by blank flanges before commencement of the test.

After laying, jointing and anchoring, the main should be slowly and carefully charged with water so that all air is expelled, allowed to stand full for several days and then tested under pressure. The test pressure shall be applied by means of a manually-operated test pump connected to the main and to two parallel installed pressure gauges calibrated at an approved testing laboratory. The test pressure shall be maintained for 24 hours, and if there is any leakage or any other defects, the contractor should rectify as directed by the Engineer at his own cost. Water drained from the pipes shall be discharged in a way that does not affect the stability of the works or adjacent structures. The contractor shall provide all necessary equipment, water and labour to test the pipes to the approval of the Engineer.

The contractor shall allow for all expenses in connection with testing in the Bill of Quantities for the appropriate item.

9.13 Cleaning and Sterilization of Water Supply Pipes

The contractor shall before handing over and during the maintenance period clean pipeline, chambers and manholes for all dirt and rubbish.

All pipes shall be thoroughly cleaned and washed out to remove all contamination, and all water from these operations shall be removed and drained away. Sterilization should be carried out in accordance with BS 13700.

Following the satisfactory cleaning the contractor shall with the use of a portable dosage system or by some other approved method introduce a solution of a sterilizing chemical containing chlorine into the pipeline. The solution shall be introduced at a very slow rate and shall be of such strength as to give a chlorine concentration of not less than 50 parts per million throughout the length of the pipelines. The whole system shall then remain charged for 24 hours, after which a test shall be made for residual chlorine. If no residual chlorine is found, the sterilization process will have to be carried out again, until a satisfactory result is obtained.

Finally, the pipes shall be thoroughly flushed out and recharged with supply water. On completion of the sterilization process the pipes shall be left full of water.

The contractor shall in his rates for pipeline sterilization include for all costs of labour, transport, materials, equipment, chemicals and water necessary for the satisfactory completion of the cleansing and sterilization operations.

9.14 Auxiliary Works

(a) Valve Chamber

Unless otherwise directed or detailed all valves, meters and other mechanical fittings shall be housed in chambers with lockable covers. Valve work shall be so placed in chambers as to facilitate operation, meter reading etc. through the cover opening. Chambers are measured in numbers and shall be priced as lump sum items covering all composite work to completion as specified on the drawings or as instructed by the Engineer inclusive of excavations in excess of trench excavation, concrete supports for valves and backfilling around the chambers.

(b) Thrust Blocks and Anchors

The contractor shall provide thrust blocks at all bends, tees and whenever else instructed by the Engineer or indicated in the drawing.

Enlargements shall be excavated in sides and bottom of the trench to accommodate anchorages and thrust blocks.

Concrete thrust and anchor blocks shall be formed in accordance with the typical sections shown on the drawings or as directed by the Engineer. Additional excavation shall be made after the bends etc. Have been jointed and the concrete shall be placed immediately after the completion of the excavation.

The concrete used for thrust and anchor blocks shall be grade 15 and shall after placing be kept in view for not less than six hours. No pressure shall be applied in any section of mains until the concrete has cured at least three days.

All PVC material shall be wrapped with two layers of bituminous felt for the entire length in contact with concrete. Thrust blocks are measured in numbers and shall be priced as lump sum items covering all necessary works and materials together with excavation, backfilling and formwork.

(c) Road Crossings

When the contractor encounters a road where a “Road Crossing” is indicated on the drawings or where to his opinion, such a crossing is required, he shall immediately inform the Engineer. On the receipt of the above information, the Engineer will issue appropriate instructions. The contractor shall include in his rates any royalty/fees to be paid to the Ministry of Transport and Communication or Local authorities.

(d) Painting

Painting and other protection of the external and internal pipe surfaces shall be in accordance with manufacturer’s recommendations. Painting on all other works especially in buildings will be as specified in the Bill of Quantities or as directed by the Engineer.

(e) Indicator Posts

Indicator posts should be erected on the pipeline as per the Engineer’s instructions.

All indicator posts for sluice valves, air valves, change in directions for pipeline, change in class of pipes, washouts etc should be painted with blue gloss paint (2 coats). The engraved letters to be painted with

10.0 METHOD FOR BOREHOLE CONSTRUCTION

10.1 Location of borehole

The final locations of borehole will be given by the Project Manager, with a minimum 5 days’ notice before erection of rig at site.

10.2 Drilling techniques

a) Depth and boreholes design

The borehole to be drilled will be required to penetrate thickness up to 10 m to 20 m soil or poorly consolidated sediments. The contractor should indicate clearly in his proposal the drilling technique he will operate for drilling the first poorly consolidated levels.

The required drilling technique down to a depth of about 230m is rotary drilling with bentonite accepted in the drilling fluid .

b) Centralisers and end plug

In order to achieve the required borehole linearity, all casing permanently installed in wells should be fitted with centralisers at 6 meter intervals or as otherwise directed by the Project Manager. The centralisers should be factory manufactured from spring steel straps welded to hinged steel collars to the approval and direction of the Project Manager.

A factory manufactured stainless steel end plug will be installed at the bottom of the screen and tubes.

c) Gravel pack installation

A special attention will be paid to quality of gravel pack installation. The mud circulation should be maintained during gravel pack installation.

No gravel pack could be installed in the well without use of a cross-over tool. With this tool, the fluid and filter pack pumped down through the drill pipe will discharge bellow the packed associated to the cross-over tool while the return flow will be conducted up through the packer into the annular space around the drill pipe. The stinger pipe below cross-over tool will extend to some 1 m of the bottom of the screen.

In order to prevent undesirable separation of coarse and fine fraction of the gravel pack, the uniformity coefficient of the mixture will be lower than 2.5 (see § 5.6. Characteristics of the gravel pack). In order to check the perfect installation of the gravel pack, a 3m piece of telltale screen will be installed above the production screen, inside the telescoped section.

d) Partial backfilling of wells

The Contractor may be required to backfill an existing well to a depth specified by the Project Manager. The backfill material will consist of sand and ten millimeters by twenty millimeters crushed or graded gravel or other sized gravel. All such backfill material must be approved by the Project Manager before being used in the well.

e) Cementation under pressure

The Cementation under pressure should be done from the bottom through a cementing shoe: the annular space shall be filled in by cement up to cement appears at the surface. If cement fail to reach the surface, the Contractor, should at his own cost and to the satisfaction of the Project Manager, demonstrate that the cement is continuously sealing the casing from the bottom to half of the cemented depth. It should then continue the cementation from the surface and finally demonstrate at his own cost and to the satisfaction of the Project Manager, that cement is continuously sealing the whole casing.

Should the Contractor fail to conduct these operations to the satisfaction of the Project Manager, the borehole may be declared lost.

f) Failure of casing strings to enter well

In the event that any string of casing will not enter the well, the casing will be removed and the well will be reamed or re-drilled. If the string of casing still does not enter the well, the well will be declared lost.

10.3 Drilling Sequence

10.3.1 Drilling of the poorly unconsolidated levels, up to 10 to 20 m

10.3.2 Installing of a surface casing from the bottom of the hole to the surface

10.3.3 The surface casing will be fixed in position by cement being placed in the bottom half meter of the hole by tremmie pipe installed inside the casing, to ensure that the surface pipe remains plumb, and that there is an annular seal for the cement. The annular space between the well and the surface casing will then be filled with cement up to 1 m below ground surface. Once in place the cement will be allowed to set for a period of 12 hours

10.3.4 Drilling of the borehole down to a depth of about 250 m (diam. 8”) below the ground.

10.3.5 An electrical well logging shall be performed and decision can be taken to continue drilling

10.3.6 Gravel pack shall be installed beneath the screens and tubes using a cross-over tool.

10.3.7 The borehole is then developed

10.3.8 A full pumping test is completed

10.3.9 The well head is constructed

10.4 Sampling and logging

a) Formation Sampling

Representative samples of the strata penetrated will be collected every meter (or as otherwise directed and approved by the Project Manager), by whatever method is standard for the drilling technique in use.

A sample of the formation cuttings will be removed from the drilling medium by collecting the sample in a screen, or by collecting a large sample of the drilling fluid and allowing the

cuttings to settle out. Care will be taken to ensure that the sample is representative of the material being drilled and not contaminated by hole erosion or cavings.

The samples will be placed in approved and appropriately marked heavy plastic sample bags and handed over in a sturdy box to the Project Manager. The sample box will be a container fitted with individual compartments for the samples. A card will be inserted into each compartment along with the sample, indicating, in water-proof ink, the depth from which the sample was recovered.

When requested by the Project Manager, the samples will be displayed in a neat and organized manner so that the entire geologic section is clearly represented.

b) Well head logging

Penetration rates, measured as minutes per meter drilled, must be recorded for every meter in the drillers log in regard with the pressure on the tool. The Contractor must report immediately to the Project Manager's representative on site any changes in the penetration rate. The penetration rate report must include the method of drilling used and if any changes in the drilling method must be recorded its depth and time of change. Drilling interruption for flushing without drilling, stoppage during installation of additional drill pipes; breakdowns, etc must be properly recorded so that the drilling rates can be properly interpreted purely based on time taken for drilling.

The contractor shall endeavour to operation in such a way as to detect water strikes by noting increases in flow rates. For this purpose marsh funnel and stopwatch must be available. In order to measure yield rates during drilling and so to obtain an indication of water strikes, the return water must be directed through a gauging weir consisting of a 90o weir plate (V – Notch) installed at a suitable point in the return water circulation system. The dimension of the V-Notch should be at least 800mm wide across the top and the V and 400 mm vertical depth.

10.5 Borehole development and cleanup

Well development will be conducted with successively both airlift pump system and interrupted over-pumping. All well development methods and chemicals must be approved by the Project Manager.

For airlift pump system, it is a requirement that the double-tube airlift method to be used by the drilling contractor for the development of boreholes. Development must begin from the bottom of the borehole, the apparatus being placed about 1 m above the base of the borehole. The air is turned on and off repeatedly to agitate the fine material within the gravel pack and the surrounding formation. This process continued every two meters upward within the borehole until the static water level is reached. Once this is completed the apparatus is lowered to the bottom of the borehole to remove sand and gravel and the borehole is then further airlifted until the water is totally clean to the satisfaction of the Project Manager.

For interrupted pumping, the pumping shall be done at rates up to 2 times the design capacity. The pumping should be carried out in at least 5 steps, which should include pumping rates of 0.25, 0.5, 1, 1.5 and 2 times the design capacity, with no check valve nor foot valve present. Pumping shall be conducted in 5 minute cycles.

Development shall continue for a minimum of 6 hours air-lift development plus 3 hours interrupted pumping development and until the discharge water is clean and free of sand (i.e. no more than 1 cm diam. sand stain test) or until such time as the Project Manager finds

acceptable. No payment shall be made for the extra hours necessary after 15 hours of development.

10.6 Borehole Disinfection

The Contractor shall at all times take every precaution to ensure that the borehole is kept free of contamination. The Contractor will ensure that formation stabilizer material is disinfected prior to installation.

Disinfection of the borehole shall be undertaken immediately after the borehole development process has been completed. The Contractor will devise a method for the disinfection procedure that meets the approval of the Project Manager. The Contractor will include the cost of the disinfection process in his unit process for borehole construction.

The Contractor shall ensure that the disinfecting agent is uniformly applied throughout the entire water depth of the borehole. The disinfecting agent may be placed by a tremie pipe of sufficient length to extend to the bottom of the borehole. The disinfecting agent shall be applied through the hose that shall be raised and lowered to achieve uniform distribution of the solution throughout the borehole.

10.7 Concrete slab, well heads and capping of boreholes

a) Sanitary seal

The annular space between the borehole and wall of the surface casing shall be grouted for sanitary seal for a depth not less than 2 m below ground surface with mixture of cement and water slurry by a pour-in method from the top.

Cement grouting shall be carried out in one continuous operation before initial setting of the cement occurs. 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 2 m below the wellhead. The method proposed by the Contractor will be changed or modified if and required to suit the local conditions.

b) Construction of concrete slab

After the completion of the borehole to the satisfaction of the Project Manager, the Contractor if must excavate around the sanitary seal until reasonably firm formation is reached.

The ends of the surface casing shall be cut off 0.5 m below the surface level.

The Contractor shall construct a reinforced concrete block (with 12 mm steel reinforcing rods at equal spacing) with the surface dimension of 1 m width, 1 m length and 1.5 m high (1 m below the surface level, 0.5 m above the surface level). Surface of the concrete block will have a divergent slope.

The well casing must protrude 0.2 m above the concrete block unless otherwise specified by the Project Manager.

The wellhead block shall be cast around the surface casing in accordance with the Contract drawings, with 0.5 m inside the concrete slab.

c) Wellhead block and capping

The wellhead block without artesian pressure is detailed in the drawings section. The Contractor shall supply all materials and carry out the construction of the wellhead according to the following instructions:

- on the top of this casing, a welded flange (stainless steel, 10 mm tick);
- over the flange, a capping plate (stainless steel, 10 mm tick) bolted together with the coupling in 8 points and welded in 10 points.

The wellhead block with artesian pressure will be equivalent to the above, but should stand up to 3 bars pressure.

The well head shall be marked with the well number, in a manner approved by the Project Manager.

10.8 Lost boreholes and abandonment

a) Failure to complete wells

Should any accident to the plant, jamming of the tools or casing, collapse of the borehole, or any other causes due to the Contractor's negligence, prevent the satisfactory completion of the works, the borehole shall be deemed to be lost and no payment shall be made for that borehole or for any material not recovered there from, nor for any time spent during operations or while attempting to overcome the problems. The option of declaring such lost well shall rest with the Contractor.

In the event of a well potentially being deemed lost, the Project Manager may where possible redesign the well so that it is of use to the Employer and payment will be made in accordance with quantities and rates written in the Contract document. Should it not be possible to do this, the well shall be declared 'lost'.

A well may also be declared lost by the Project Manager if it is not completed as required due to uncontrolled caving, lost tools down-hole which cannot be recovered, lost circulation zones, unsuccessful cementing or any other reason which leads to failure of completion and which renders the well useless or of little value to the Employer.

A lost hole should be neutralised by a full cementation at the satisfaction of the Project Manager.

No payment shall be made for a lost well and its neutralisation.

In the event of lost well the Contractor shall drill a new well at a site indicated by the Project Manager.

b) Fishing

Under no circumstances will the Employer pay any charge for time spent on fishing operations due to the Contractor's negligence, broken drill string components, stuck pipe, junk in the hole or any other reason. Contractors are advised to assure themselves of the good condition of all drill string components and maintain adequate wellhead security at all times.

c) Abandonment

The Project Manager shall have the right at any time during the progress of the work to order the abandonment of a borehole.

The Contractor thereupon shall withdraw the casing from the borehole, if applicable, and salvage or attempt to salvage all such materials as the Project Manager shall direct and/or up until the Project Manager revokes such direction and shall fill in or leave the borehole to the satisfaction of the Project Manager. Aquifers may be sealed by cement.

Payment shall be made for such abandoned boreholes at the rates and tariffs shown in the Bill of Quantities.

11.0 AQUIFER TESTING AND WATER QUALITY

11.1 Introduction

The aquifer pumping test is a thorough and precise test of the characteristics of the water bearing formation in the vicinity of the well. It is of prime importance that the Contractor correctly monitors test pumping operations to ensure that accurate data is obtained. Testing work will be carried out with the intent of maximising the chances of success in completing tests within the allocated period of time.

For testing operations, the pump test will be installed at the bottom of the pump house, i.e. the bottom of the casing.

11.2 Calibration test

Before beginning the actual tests on each well, a calibration test must be undertaken. This involves checking that all equipment including the pump, generator, manometer and pipes are working satisfactorily. The discharge pipeline shall be checked for leaks. The gate valve shall be graduated and relative discharge positions marked in preparation for the step test. Once the calibration test has been completed the well must be allowed to recover to the satisfaction of the Project Manager, before the actual test pumping operations can begin.

The cost of the calibration test shall be uniformly spread over the pump test items of the Bill of Quantities.

11.3 Tests sequence and duration

If calibration test shows that a well has sufficient capacity to be interest, pump testing shall be carried out. The following two types of test may be conducted according to the instruction of the Project Manager.

- Continuous Step Draw-Down test: The Step Draw-Down test shall have six (6) steps of one (1) hour each, without rest period. The test shall begin with the lowest discharge rate (about 1/5 of the pump capacity) and increase consecutively until the maximum discharge rate is reached. (about 150% of the planned well yield). Upon completion of the step drawdown test, a step recovery test shall be undertaken, which should normally last for at least two (2) hours or as otherwise directed by the Project Manager.
- Constant discharge test. Constant discharge tests will be hundred twenty (120) hours in length followed by a twenty four (24) hours recovery period, at a pumping rate close to the planned well yield (70 l/s or 115 l/s). The Project Manager or his representative during the test on the basis of the measurements made and his analysis may increase or reduce both periods thereof.

The pump test shall be terminated only upon the written notice of the Project Manager or his representative.

The test pump cannot be removed from the well during the recovery periods.

The pumped water during pumping test should not be allowed to form pools to avoid re-infiltration in the vicinity of the wells. If the Project Manager feels that infiltration would take place around the well he can order the Contractor to dispose the water by means of discharge pipes toward a nearby natural drain over a distance where infiltration in to the aquifer during testing is negligible.

11.4 Water level measurements

During the period of the tests, the Contractor shall measure and record water levels in the pumped well. For measurement of water levels in wells, pressure meter or electric water level indicators shall be used.

If water level indicator is used, the Contractor shall have at least two water level indicators on each site. In the tested well, the measurement will be done through a temporary measurement pipe which shall be deep enough to reach the top of the pump.

The water level measurement will also be done in up to 2 neighbour wells designated by the Project Manager.

For the tested borehole, the following time intervals are recommended:

Every	1	minutes from	0	to	10	minutes of pumping
Every	2	minutes from	10	to	30	minutes of pumping
Every	5	minutes from	30	to	60	minutes of pumping
Every	10	minutes from	60	to	360	minutes of pumping
Every	15	minutes from	360	to	600	minutes of pumping
Every	30	minutes from	10	to	24	Hours of pumping
Every	60	minutes from	24	to	72	hours of pumping

11.5 Flow measurements

Flow measurements shall be made by means of a gauging weir consisting of a 90o weir plate (V – Notch) as described in the drawing section.

Flow measurements will be made for any water level measurement.

The contractor is responsible with mobilising testing pump with sufficient capacity to meet the planned well yield.

11.6 Interruption of the test pumping

The discharge rate during the pumping shall be maintained within five per cent of the rate established by the Project Manager and the Contractor shall maintain uninterrupted pumping during the period of all tests. If not so, the Project Manager may declare the test interrupted. Shall the Contractor fail to provide accurate water level and flow measurement with the recommended frequency, the Project Manager may also declare the test interrupted.

No payment will be made for the elapsed time of the test prior to the interruption.

Unless otherwise directed by the Project Manager, interrupted tests shall not be restarted until sufficient time has elapsed for complete recovery of the water levels in the pump or observation well and shall not be considered to be a part of the pumping test for purposes of

payment even though water level measurements shall be made during that period by the Contractor if so directed by the Project Manager.

11.7 Reporting

The contractor shall record test-pumping data on prepared sheets after the approval of the Project Manager. The data sheet shall be filled in the English language. The data sheets prepared in triplicate shall include the following information:

- 1) The location of the well being tested.
- 2) The physical characteristic of the well including depth, diameter, size length of casing screen setting and length of screen.
- 3) Characteristics of the test pump
- 4) Depth of setting of the test pump in meters.
- 5) Date and time of start and finish of pumping test.
- 6) Static water level at commencement of test, dynamic water levels and discharge rates at prescribed time intervals.
- 7) Draw -down recovery after pumping is completed.
- 8) Date and time of start of removal of test pump from the borehole.

11.8 Water samples and analysis

Water samples for water quality analysis must be collected during the pumping test as directed by the Project Manager. Each sample consists of 4 containers as in a glass or suitable plastic container of 1-liter capacity each.

Water samples should be clearly marked showing name and number of well, date of sampling, hour of sampling, temperature and conductivity of water during sampling and signature of person taking the sample.

2 sets of samples are dedicated for future ICP-MS analyses and will be stored.

1 set will be stored for cross-check analysis if required.

One sample shall be sent to a Laboratory approved by the Project Manager within 12 hours after sampling. During transportation, the sample shall be kept in an isotherm box.

The contractor shall carry out water analysis for at least the following:-:

- Temperature
- Electrical conductivity at 25°C
- pH at 20°C
- Cations: Ca⁺⁺ Mg⁺⁺ Na⁺ K⁺ and total Fe
- Anions: Cl⁻, NO₃⁻, SO₄⁻⁻ and HCO₃⁻

Note:

- a) The Project Manager may order additional analyses if deemed necessary to achieve project objectives

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- b) Contractor is responsible in ensuring that the samples are stored in correct temperature condition throughout the contract, if deemed necessary the contractor shall provide air-conditioned room exclusively for storing the samples.
 - c) Time of storing: till the demobilization.

12.0 QUALITY OF MATERIALS AND WORKS

12.1 Erection of drilling machine at borehole site

The drilling machine must be erected at the borehole site in such a way that the hole will be drilled within 1 m of the marks which is shown to the contractor by the Project Manager. No payment will be made for a well not located at the designed site.

12.2 Verticality and alignment of boreholes

The wells will be drilled and cased straight and vertical, and all casing, screen or liners will be set plumb and true to line.

Upon completion of drilling or at any other time, the borehole shall be tested for verticality and straightness using deviation-measuring instruments like Inclinator, Draft Indicator...etc provided and operated by the Contractor at the Contractor's own expenses. Readings of deviation and direction will be taken at three meters depth intervals. Deviation shall be no more than 10%.

After pump house casing installation, verticality will be tested by the plumb-bob method. The dummy will consist of an axially suspended cylinder (or cage-ring) at least 7 m long with an external diameter as specified in the Conventional Code of Testing Boreholes. The suspending wire should be less than 5 millimetres diameter of uniform cross section with no kinks. Dummy should freely be passed down the borehole without force. Dummy is provided and operated by the Contractor at the Contractor's own expenses.

Should the plumb or dummy fail to move freely throughout the length of the casing or hole to the bottom of the housing line or should the borehole vary from the vertical in excess of above specified value, or beyond limitations of this test, the plumbness and alignment of the borehole shall be corrected by the contractor at his own expense. Should the contractor fail to correct such faulty alignment or verticality, the well may be deemed lost. The Project Manager may waive the requirements of this paragraph for verticality if in his judgment he establish that:-

12.2.1 The Contractor has exercised all possible care in constructing the borehole and the defect is due to circumstances beyond his control.

12.2.2 The usefulness of the completed borehole will not be materially affected.

12.2.3 The cost of necessary remedial measures will be excessive.

In no event will the provisions of this paragraph with respect to alignment be waived.

12.3 Assembling of casing, tubes and screens

The assembling methodology for casing, tubes and screen will be submitted to and approved by the Project Manager before operation. A particular attention will be paid to the external

diameter of tubes and screens, and his compatibility with cementing or gravel pack installation. The 18”5/8 casing may be coupled to each other either with welds. In order to secure mechanical and corrosion resistances, the Contractor should submit the certificates and qualifications of the

welding operator as well as the welding procedures to the Project Manager and get his approval before starting operations. All welding electrodes must comply with the Standard Specifications DIN 1913 or AWS (American Welding Society) standards.

The 13”3/8 tubes and screens may be coupled to each other either with tight sleeve connection (ZSM connection 2 rods version).

The 8”5/8 and 10”3/4 (type 2) tubes and screens may be coupled to each other either with tight sleeve connection (ZSM connection 2 rods version) or with API round threaded connection.

The 10”3/4 (type 1) tubes and screens may be coupled to each other either with API round threaded connection.

In case of threaded connections, the lubricating compound shall not contain any heavy metal or hydrocarbon.

12.4 Characteristics of the drilling fluid and additives

In order to limit the environmental impact and to improve the mud quality, the contractor should use mud tanks. Hand dug pits for mud are forbidden.

Drilling mud should be of biodegradable type and non-toxic and amenable to degradation by an appropriate chemical agent. The use of bentonite mud is only authorized for drilling of the sealed terrain, i.e. less than about 230 m.

The Contractor must ensure that if the Employer or Project Manager specifies mud drilling, he has the necessary equipment including mud pumps, viscosity-measuring apparatus, water tanks etc., to enable him successfully complete the works.

The Contractor shall specify the brand name and manufacturer of any mud or chemicals or additives proposed to be used and include technical specifications or any other relevant data. Readings of the mud condition (pH, viscosity, density and sand content) will be collected and recorded as directed by the Project Manager. Steps will be taken immediately to correct any variations of the preferred values.

A special and permanent attention should be paid to the density of the drilling mud, in regard to the expected high artesianism of the aquifer. Balanced mud weights will be used for control of the artesian conditions. Barite may be used for mud weight control.

Where applicable and required, mud dispersing agents (such as glassy phosphate), acids for washing limestone, and other chemicals applicable to standard procedures may be used as. If polyphosphates are used, it must be followed by well disinfection. It is recommended, however, to provide a polyphosphate product that already contains disinfecting agents (i.e.

‘_Weltone’ or equivalent).

12.5 Characteristics of the casings and screens

Surface casing can be standard black steel casing. All other casing, plain tubes and screens will be made of 304L stainless steel or equivalent.

All screens to be installed into the boreholes would be with 0.75 mm slot (tolerance 0.2 mm). This slot might be modified to 1 mm (tolerance 0.2 mm) slot after the first series of tests. The authorized open area will range from 6.5% to 9.5%, in order to maintain an entry velocity from 2 to 3 cm/s. In case of use of pipe base wire wound screens, the pipe has to offer an open area significantly higher than the continuous wire open area, and 13% minimum.

All casing and tubes supplied by the Contractor and which will be installed permanently in the boreholes must be with no circular welding; only longitudinally welding is allowed except to connect the fittings. None of the pipes will be made of short pieces welded together.

All casing and tubes supplied by the Contractor and which will be installed permanently in the boreholes must be new and must comply with the ASTM standards. The appropriate manufacturer's product information pamphlets with full details of the offered casing, tubes and screens, including method of joining must be provided to the Project Manager and accepted before installation in the hole.

12.6 Characteristics of the gravel pack

The gravel pack will consist of quartz sand and gravel will not contain any carbonate calcium. The material must be clean well-rounded 90 % composed of quartz. The use of angular crushed material is not acceptable. Considering the nature of the aquifer material and the specified screen aperture, the required grain size for 95% of the gravel pack material should be 1.0 mm to 2.5 mm.

5 kg sample of the gravel pack material must be submitted to the Project Manager for approval before use. Such approval shall be issued in writing and under no circumstances is the contractor to produce gravel for the work until such approval has been received.

12.7 Characteristics of the cement

a) Cement

All cement, which is used, must comply with the Standard Specification DIN 1164, EN 197, DIN 18555 and must not be older than three months. Unless otherwise instructed by the Project Manager or the Employer, a hardening agent such as calcium chloride should not be used to accelerate the cement setting process. The normal aggregate size for use with the cement may not exceed 19 mm unless otherwise stated.

b) Cement slurry

The cement used for cement slurry will be PORTLAND artificial CPA325 type.

The water used shall be potable water. No less than 800 kg of cement will be used per cubic meter of water.

d) Cement mortar

The cement used for cement slurry will be PORTLAND artificial CPA325 type.

The water used shall be potable water. No less than 50 kg of cement will be used for 100 l of water. A minimum of 600 kg of cement shall be used per cubic meter of sand.

12.8 Tools and accessories

For accessories listed below, the contractor should provide and get approved drawings including all technical details, quality plan, reference and origin:

Production well head with and without artesian pressure

12.8.1 Bottom plug;

12.8.2 Centralizers;

12.8.3 Handling tools and clamps for pipes and screens (according to EEC safety rules), and;

12.8.4 Cross-over tool.

13.0 SOLAR INSTALLATIONS

1. All components shall conform to regulatory guidelines
2. All components must be warranted for a minimum of 25 years (panels) and 5 years (inverter and other related components)
3. Minimum output of the system shall be specified, guaranteed and warranted.
4. Access to all junction boxes, conduit and the solar PV panels must be available at all times. In case of a support stand structure, the minimum height of the stand shall be 5m. Walkway space with a minimum of 1 ft between every two rows shall be applied for roof mounted systems, and 2ft for ballast systems -ground- mounted or otherwise.
5. The rating of the system shall consist of the total sum of the power rating of the inverter or the solar PV panels, whichever is the less.
6. The rating of the system shall conform to the IEE standard
7. Wherever possible system orientation should face south. Where this is not possible, the Contractor must position the PV modules in such a manner that the maximum power is obtained with the sun's movements during the day.
8. The systems must meet safety and workmanship standards. Guarantee of Workmanship to surpass IEE Regulations.
9. Manufacturer's authorization must be provided.
10. Guaranteed expected output of the system in kWh/ per month must be maintained. The system should experience no more than 20% degradation in 25 years
11. The inverter location must be agreed with the Client and layout of cable/conduit runs
12. Appropriate and approved methods of sealing cores in walls, roofs or slab must be employed
13. All conduit and cable must be UV rated
14. All exposed material supports, saddles and screws shall be made of stainless steel.
15. Cable ties and metal clips (stainless steel) should be used to secure wiring and conduit. No wires shall be left unsecured.
16. PV source circuits must be placed in metallic raceway when inside buildings prior to the first grounded DC disconnect
17. Shading of panels should be avoided as much as possible – this includes shading from trees, walls, parapets, superstructures and roof structures.
18. A slope angle of about 5 degrees should be employed for the installation
19. The job site shall be clean and clear of debris at the end of every working day
20. The contractor is expected to follow all necessary and relevant minimum standard safety procedures in carrying out his work. The minimum safety equipment to be used on each site: steel toe boots, safety harnesses while on roofs and vest or shirts identifying personnel. Hardhats, protective eyewear, safety plan established, ladders attached to building, controlled access zone (monitor and worker pair) mandatory safety training for employees
21. construction of a power house may be necessary to house inverter and associated electrical housing. Trench work may also necessary. All housing must be of weatherproof construction of suitable and sound material: concrete, fiberglass, treated woods.

-
22. Inverter location and conduit runs: where possible a suitable location of the inverter and the electrical run of conduits and cables should be identified. These however should be the final decision of the beneficiary.
 23. The system and its components must be NEW. Panels, inverters and other major equipment which has been used in any other way for a previous installation or turned on for any other reason before being commissioned by the contractor will not be accepted.
 24. The available electrical supply is;
230 -240 Volts with a cycle of 50 Hz and for the three phase is 380-415 Volts.
Supplier should review connection points carefully and specify/design the system accordingly.
 25. The PV system will be expected to perform satisfactorily in relative humidity up to eighty-five percent (85%) and temperature as high as thirty degrees Celsius (30°C).
 26. The design must be suitable for rooftop or ground mounted installation and such that it maximizes the annual energy production utilizing the available rooftop space before utilizing other areas, if required, to achieve the indicated kW output.
 27. Installation of any structure for array panel mounting or equipment housing must have minimal no (ZERO) impact on structural integrity of the existing roof structure.
 28. The design and installation must minimize the risk of vandalism, theft and personal injury in the installation and operation of the system.
 29. All equipment and electrical hardware used in this system, including overcurrent protection, disconnects, surge suppression devices, conduit, wiring and terminals, must be approved, recognized, and listed for the intended application, and have appropriate voltage, current and temperature ratings for the application
 30. Inverters, controllers and PV modules must have specific listings as noted elsewhere in this document. All circuit breakers, fuses and disconnects must be listed or recognized for use in Direct Current (DC) circuits where applicable. Equipment only rated for use in AC circuits will not be permitted for use in DC circuits.
 31. All wiring (conductors) must be properly sized and rated for the application, including ampacity (including temperature and other deratings), location/application (exposure to elements, enclosure) and voltage drop.
 32. The system conductors must have appropriate means for disconnecting and overcurrent protection, and require the use of switches, fuses and circuit breakers as applicable. All overcurrent devices must have trip ratings.
 33. A weather-tight, vented, locking, pad mountable enclosure must be supplied by the contractor, suitable for housing the inverter, controllers, AC/DC disconnect devices, and source circuit combiner boxes (as required), in an outdoor or indoor environment as required for the specific application.
 34. The power output of the PV module must be reported under standard test conditions (STC). Current versus voltage (I_V) curve of the intended modules to be used must be submitted with the bid.
 35. An outdoor rated disconnect device must be installed on the systems at the interface between the PV system inverter and the primary electrical system served by the utility grid. This disconnect device must be a visible break, lockable device, and must be installed at a convenient location on the outside of the premises near the utility service entrance and meter.

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36. All electrical equipment, enclosures, disconnects and overcurrent devices must be clearly marked and identified.

Protection

37. All metallic module frames, panel/array support structures, metal enclosures, panel boards and the inverter cabinets must be properly bonded to a common grounding conductor and terminated at a ground rod or system installed at the utility service entrance point. If a ground rod or system is not already present, a grounding rod or network must be installed with a preferred maximum earth resistance of twenty-five ohms (25Ω). All grounding connections and terminations must be made accessible for routine inspections and maintenance as required. The neutral conductor of the inverter output must be grounded at the electrical service panel. No other AC connections to the grounding system are required.
38. The PV system must have an Integrated Grounding system: instead of connecting a ground wire to each and every module, the array must be grounded directly to the rails with the patented Sharp talon clip or similar, which in turn greatly reduces labour time and complexity.
39. The Contractor must submit “as built” drawings of the complete system as part of this contract.
40. Surge suppression on the DC and AC side of the inverter must be provided
41. All Equipment and accessories must comply with the requirement of standards for design, manufacture and installation of grid connected PV systems. The list of standards adopted must be indicated in the bid along with a certified copy showing compliance. These certificates must have been issued within the last two (2) years from the date of bid opening or still valid at the date of bid opening; this must be shown by clearly stating the expiration date.
42. The PV Module and system must be provided with acceptable Test & Certified documents.
43. The quality of equipment supplied must be generally controlled to meet the guidelines for engineering design included in the specifications/standards and codes listed in the relevant specifications/standards, such as or equivalent,

DRAWING

The following drawing are provided;

S/No	Description	No. of Sheets	Remarks
1	Standard Water Kiosk		
2			
3			

BILL OF QUANTITIES

OL KALOU WATER SUPPLY PROGRAMME					
ABORETUM SITE					
Item	Item description	Unit	Quantity	Rate (Kshs)	Amount (Kshs)
Bill No.1	Preliminary and General items				
1.1	Mobilization and Demobilization from site	LS	1		
1.2	Carry out Hydrogeological survey and process necessary drilling permits	LS	1	100,000	100,000
1.3	Prepare and Erect Project signboards(Temporary and permanent) as directed by the Engineer (PS)	No	2	30,000	60,000
1.4	Supervision of Works (PS)	Item	Lumpsum	150,000	150,000
1.5	General Painting and Branding of the works (PS)	Item	1	40,000	40,000
1.6	Allow for Contractors attendance and profit to items 1.4	%	20%	150,000	30,000
	Sub Total for P&G items				380,000
Bill No. 2	Drilling and test pumping of borehole				

2.1	Drilling borehole of 8 inch minimum diameter through all types of strata including disposal of excavated materials; taking any remedial measures to overcome caving- in , or over drilling to accommodate sloughed material and keeping drilling records as specified	m	250		
2.2	Supply and Install mild steel Permanent casing 6 inch nominal internal diameter plain casing	m	170		
2.3	Supply and Install mild steel 6 inch nominal internal diameter Slotted casings screens.	m	80		
2.4	Supply and 10" insert surface casings m Rates Only	m	Rates Only		
2.5	Allow for taking samples of drill cuttings at two (2) meters intervals.	No	125		
2.6	Supply and insert approved special clay.	Item	Lumpsum		
2.7	Supply and insert filter gravel packing 2mm to 5mm size.	Ton	7		
2.8	Grout between the inner casing and the outer surface casing for top Six (6) metres.	Item	Lumpsum		
2.9	Borehole development work including inserting and removal of development equipment	Hrs	8		
2.10	Test pumping step draw down and constant discharge test including installation, removal of test pumping equipment , water level observations and draw down measurements	Hrs	24		
2.11	Undertake Water Level observation and record on Recovery	Item	Lumpsum		
2.12	Supply of water for drilling operations and field camp	Item	Lumpsum		

2.13	Carry out physical and chemical analysis of the borehole water.	Item	Lumpsum		
2.14	Borehole disinfection as specified	Item	Lumpsum		
2.15	Data analysis, drilling, borehole completion reports, pump test report compilation in three hard copies and 1 electronic copy for each well.	Item	Lumpsum		
2.16	Concrete slab 1*1*1m (1:3:6)	m ³	1		
2.17	Borehole cover 6" diameter welded to the casing	No	1		
	Sub Total for Drilling and Test Pumping				
Bill No 3	Borehole equipping and solar system				
3.1	Provisional sum for supply, installation, testing and commissioning of a submersible pump capable of pumping expected yield against a head to be identified, complete with solar system, solar pumping control unit and support structures 4 metres high, installation sundries and all accessories including cables and pipes and fittings. NB: Designs for pump and solar must be approved by the Project Manager .	PS	1	3,000,000	3,000,000
	Sub Total Borehole equipping and solar system				3,000,000
Bill No.4	Water tank and pipe works				
4.1	Provisional sum for supply, installation, testing and commissioning of a 24m ³ Pressed Steel tank on 18m high Steel Tower .(Subject to Engineers approval)	No	1	1,500,000.00	1,500,000

4.2	Excavate Pit for Tank Foundation backfill and dispose the surplus as directed	m ³	6		
4.3	Vibrated Reinforced Concrete Foundation footing 1*1*0.3m (1:2:4) for item 4.1	m ³	1.2		
4.4	Vibrated Reinforced Concrete Foundation column 0.3*0.3 *1.2 m (1:2:4) for item 4.1	m ³	0.5		
4.5	Supply , Cutting ,bending and fixing D16 Reinforcement bars	Kg	37		
4.6	Supply , Cutting ,bending and fixing D12 Reinforcement bars	Kg	52		
4.7	Supply , Cutting ,bending and fixing D8 Reinforcement bars	Kg	17		
4.8	Allow for setting out and fixing the Template with bolts to the Vibrated Reinforced column supplied by the Steel tank and tower Supplier.	Item	1		
	Pipe work				
4.9	Lay and test 2"Ø G.I class B rising main from the borehole to the tank and to the water kiosk	m	60		
	Sub Total for tank and pipe works				
Bill No.5	Water Kiosk				
5.1	Excavate top soil Average 150mm depth And cart away 5 meters for re-use.	m ²	20		
5.2	Excavate pits for 4No. 900 x 900 mm VRC columns starting at 150mm below ground level but not exceeding 1m depth	m ³	11.6		
5.3	Excavate trench for strip foundation starting at 150mm below ground level but not exceeding 1m depth	m ³	6.5		

5.4	Construct 50mm thick x 600mm wide blinding to foundation (1:4:8)	m ²	2.7		
5.5	Construct 50mm thick x 1000mm wide blinding to foundation Concrete (1:4:8)	m ²	1.5		
5.6	Construct 50mm thick x 900 x 900mm blinding to Column Footing concrete (1:4:8)	m ²	3.24		
5.7	Construct 200mm thick VRC strip foundation (1:2:4)	m ³	1		
5.8	Construct 300mm thick x 900 x 900mm VRC Footing (1:2:4)	m ³	1		
5.9	Construct 200mm thick foundation walling with mortar (1:4) jointing	m ²	12		
5.10	Construct 200 x 200 x mm x 3350mm high VRC Column (1:2:4)	m ³	0.55		
5.11	Lay approved hard-core 300 thick layer	m ²	12.5		
5.12	Provide and Place 50mm approved murrum and properly rammed.	m ²	6		
5.13	500 gauge polythene damp proof membrane on the blinded surface.	m ²	8.5		
5.14	VRC Floor slab (1:2:4) 100mm thick.	m ²	8.5		
5.15	VRC Floor slab (1:2:4) 150mm thick.	m ²	6.6		
5.16	200mm wide Bituminous Felt DPC	m	9.5		
5.17	Construct 200mm thick walling with mortar (1:4) jointing. The external side of the walling is Keyed.	m ²	19		
5.18	VRC ring beam measuring 225 x 200mm (1:2:4)	m ³	0.5		
5.19	150mm VRC (1:2;4) roof slab with 150 x 150mm parapet	m ³	1.3		
5.20	D12 in columns, beams and roof slab	Kg	127		
5.21	D8 bars in foundation, columns and roof slab	Kg	182		

5.22	D8 foundation, columns and roof slab	Kg	33		
5.23	BRC A142 in floor slab	m ²	13		
5.24	Allow for formworks to all the reinforced concrete elements	Item	1		
5.25	25mm thick floor screed (1:4) mortar	m ²	14		
5.26	25mm thick plaster to walls (1:4) mortar	m ²	21		
5.27	15mm thick roof screed (1:4) mortar	m ²	16		
5.28	Provide, fabricate and fix steel casement door (2160mm x 830mm)	No	1		
5.29	Provide, fabricate and fix grilled steel casement window(1440mx600mm)	No	1		
5.30	Provide and apply three coats of paints On the internal walls and roof slab.	m ²	37		
5.31	Provide and install 20mm diameter Consumer meter	No	1		
5.32	Provide and fix 40mm diameter back nuts	No	2		
5.33	Provide and fix 20mm diameter back nuts	No	4		
5.34	Provide and fix 20mm diameter Elbows	No	10		
5.35	Provide and fix 20mm diameter Equal Tee	No	1		
5.36	Provide and fix 20mm diameter Ball Cocks	No	2		
5.37	Provide and fix 20mm diameter Union Sockets	No	2		
5.38	20mm G.I class B pipes	No	2		
	Sub Total for Water Kiosk				-
Bill No.6	Fencing and Gate				
	<i>Provide, dig holes, install and fasten:</i>				

6.1	Excavate for, provide and erect chain link fence 2.4m high comprising concrete posts set 0.9m below ground level with concrete class 15 (1:4:8) surround, concrete posts at 3.0m centres with 500mm long cranks at top, 12½ gauge chain link fence, 4 No. plain wire strands threaded through holes in posts, 4 No. strands 12½ gauge barbed wire tied to cranked top of fence and weaved to form mesh, concrete strutting posts at corners and intervals as appropriate and as shall be directed by the Engineer. The rate to include for all the necessary excavation and disposal.	m	200		
	Gate				
6.2	Provide and install double gate of 4m wide X 2.4m high fabricated from dia. 50mm hollow section black pipes (gauge 16) .and 25mm x 25mm Square tubes cut and welded to form a mesh 150mm X 150mm Rate to include for 2No. 75mm x 75mm gauge 16 rectangular hollow section M.S. Gate posts and also to include for painting the gate with oxide primer and two coats of blue gloss paint	Item	1		
	Sub Total for Fencing and Gate				-
7	Allow a Provisional sum of Ksh. 500,000 for provision of Token system for purchase of water from the kiosk to be installed as directed by the engineer.	PS	1		500,000

	Summary				
Bill No.1	Preliminary and General items				380,000
Bill No.2	Drilling and test pumping of borehole				-
Bill No.3	Borehole equipping and solar system				3,000,000
Bill No.4	Water tank and pipe works				-
Bill No.5	Water Kiosk				-
Bill No.6	Fencing and Gate				
Bill No. 7	Token system				500,000
	Add 10% Contingencies				
	Grand total				

SECTION IX: TENDER FORMS

A. Form of Tender

[date]

To: [name and address of Procuring Entity]

We offer to execute the [name and identification number of contract] in accordance with the Conditions of Contract accompanying this Tender for the Contract Price of [amount in numbers], [amount in words] [name of currency].

The Contract shall be paid in the following currencies:

Currency	Percentage payable in currency	Rate of exchange: one foreign equals [insert local]	Inputs for which foreign currency is required
(a)			
(b)			

The advance payment required is:-

Amount	Currency
(a)	
(b)	

We accept the appointment of [name proposed in Tender Data Sheet] as the adjudicator.

or

We do not accept the appointment of [name proposed in Tender Data Sheet] as the Adjudicator, and propose instead that [name] be appointed as Adjudicator, whose daily fees and biographical data are attached.

We are not participating, as Tenders, in more than one Tender in this Tendering process other than alternative Tenders in accordance with the Tendering documents.

Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the contract has not been declared ineligible by the Kenya Government under Kenya's laws or any other official regulations.

This Tender and your written acceptance of it shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest or any Tender you receive.

We hereby confirm that this Tender complies with the Tender validity and Tender Security required by the Tendering documents and specified in the Tender Data Sheet.

Authorized Signature: _____

Name and Title of Signatory: _____

Name of Tenderer: _____

Address: _____

Appendix to Tender

Schedule of Adjustment Data

[In Tables A, B, and C, below, the Tenderer shall (a) indicate its amount of local currency payment, (b) indicate its proposed source and base values of indices for the different foreign currency elements of cost, (c) derive its proposed weightings for local and foreign currency payment, and (d) list the exchange rates used in the currency conversion. In the case of very large and/or complex works contracts, it may be necessary to specify several families of price adjustment formulae corresponding to the different works involved.]

Table A. Local Currency

Index code	Index description	Source of index	Base value and date	Tenderer's related currency amount	Range of weighting Proposed by the Procuring Entity	Tenderer's proposed weighting
	Nonadjustable	—	—	—	a: _____* b: ----- to -----* c: ----- to -----* d: ----- to -----* e: ----- to -----* etc.	a: _____* b: _____ c: _____ d: _____ e: _____ etc.
Total						1.00

Table B. Foreign Currency

State type: [If the Tenderer wishes to quote in more than one foreign currency, this table should be repeated for each foreign currency.]

Index code	Index description	Source of index	Base value and date	Tenderer's related source currency in type/ amount	Equivalent in Foreign Currency 1	Range of weighting Proposed by the Procuring Entity	Tenderer's proposed weighting
	Nonadjustable	—	—	—		a: _____* b: ----- to -----* c: ----- to -----* d: ----- to -----* e: ----- to -----* etc.	a: _____* b: _____* c: _____* d: _____* e: _____* etc.
Total							1.00

Table C. Summary of Payment Currencies

For[insert name of Section of the Works]

[Separate tables may be required if the various sections of the Works (or of the Bill of Quantities) will have substantially different foreign and local currency requirements. The Procuring Entity should insert the names of each Section of the Works.]

Name of payment currency	A Amount of currency	B Rate of exchange (local currency per unit of foreign)	C Local currency equivalent $C = A \times B$	D Percentage of Net Tender Price (NBP) $\frac{100 \times C}{NBP}$
Local currency		1.00		
Foreign currency #1				
Foreign currency #2				
Foreign currency #				
Net Tender Price				100.00
Provisional sums expressed in local currency	*	*	*	
TENDER PRICE				

Authorized Signature: _____

Name and Title of Signatory: _____

Name of Tenderer: _____

Address: _____

B. Tender-Securing Declaration (Mandatory)

Date: *[insert date (as day, month and year)]*

Tender No.: *[insert number of Tendering process]*

Alternative No.: *[insert identification No if this is a Tender for an alternative]*

To: *[insert complete name of Procuring Entity]*

We, the undersigned, declare that:

We understand that, according to your conditions, Tenders must be supported by a Tender-Securing Declaration.

We accept that we will automatically be suspended from being eligible for Tendering in any contract with the Procuring Entity for the period of time of *[insert number of months or years]* starting on *[insert date]*, if we are in breach of our obligation(s) under the Tender conditions, because we;

- a) Have withdrawn our Tender during the period of Tender validity specified in the Form of Tender; or
- b) Having been notified of the acceptance of our Tender by the Procuring Entity during the period of Tender validity,
 - (i). Fail or refuse to execute the Contract, if required, or
 - (ii). Fail or refuse to furnish the Performance Security, in accordance with the ITT.

We understand this Tender Securing Declaration shall expire if we are not the successful Tenderer, upon the earlier of;

- 1) Our receipt of your notification to us of the name of the successful Tenderer; or
- 2) Thirty days after the expiration of our Tender.

Signed: *[insert signature of person whose name and capacity are shown]* In the capacity of *[insert legal capacity of person signing the Tender Securing Declaration]*

Name: *[insert complete name of person signing the Tender Securing Declaration]*

Duly authorized to sign the Tender for and on behalf of: *[insert complete name of Tenderer]*

Dated on _____ day of _____, _____ *[insert date of signing]*

Corporate Seal (where appropriate)

C. Confidential Business Questionnaire

- 1 **Individual Tenderer or Individual Members of joint Ventures**
- 1.1 Constitution or legal status of Tenderer: [*attach copy*]
 Place of registration: [*insert*]
 Principal place of business: [*insert*]
 Power of attorney of signatory of Tender: [*attach*]
 Registration certificate [*attach*] current Business License [*attach*]
- 1.2 Total annual volume of construction work performed in two years, in Kenyan shillings as specified in the Tender Data Sheet; [*insert*]
- 1.3 Work performed as prime Contractor on works of a similar nature and volume over the last two years or as specified in the Tender Data Sheet in Kenyan Shillings. Also list details of work under way or committed, including expected completion dates.

Project name and country	Name of client and contact person	Contractors Participation	Type of work performed and year of completion	Value of contract
(a)				
(b)				

- 1.4 Major items of Contractor's Equipment proposed for carrying out the works. List all information requested below. Refer also to sub-Clause 12.3 of the Instructions to Tenderers.

Item of equipment	Description, make, and age (years)	Condition (new, good, Poor) and number available	Owned, leased (from whom?) or to be purchased (from whom?)
(a)			
(b)			
(c)			
(d)			

- 1.5 Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data. Refer also to sub-Clause 12.3 of the Instructions to Tenderers and Sub- Clause 10.1 of the General Conditions of Contract.

Position	Name	Years of Experience (general)	Years of experience in proposed position
(a)			
(b)			

1.6 Proposed sub-contractor and firms involved. Refer to Clause 7 of General Conditions of Contract.

Sections of the Works	Value of subcontract	Subcontractor (name and address)	Experience in similar work
(a)			
(b)			

1.7 Financial reports for the number of years specified in the Tender Data Sheet.

1.8 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List below and attach copies of support documents.

1.9 Name, address, and telephone, e-mail address, and facsimile numbers of banks that may provide references if contracted by the Procuring Entity.

1.10 Information on current litigation in which the Tenderer is involved.

Other party(ies)	Cause of dispute	Amount involved
(a)		
(b)		

- 1.11 Statement of compliance with the requirements of sub-Clause 3.2 of the Instructions to Tenderers.
- 1.12 Proposed Program (work method and schedule). Descriptions, drawings, and charts, as necessary, to comply with the requirements of the Tendering documents.
- 2. **Joint Ventures**
 - 2.1 The information listed in 1.1 – 1.11 above shall be provided for each partner of the joint venture.
 - 2.2 The information in 1.12 above shall be provided for the joint venture.
 - 2.3 Attach the power of attorney of the signatory (ies) of the Tender authorizing signature of the Tender on behalf of the joint venture.
 - 2.4 Attach the Agreement among all partners of the joint venture (and which is legally binding on all partners), which shows that:
 - (a) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
 - (b) one of the partners will be nominated as being in charge, authorized to incur liabilities, and receive instructions for and on behalf of any and all partners of the joint venture; and
 - (c) the execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.
- 3. **Additional Requirements**
 - 3.1 Tenderers should provide any additional information required in the **Tender Data Sheet** or to fulfil the requirements of sub-Clauses 12.1 of the Instructions to Tenderers, if applicable.

Authorized Signature: _____

Name and Title of Signatory: _____

Name of Tenderer: _____

Address: _____

D. Integrity Declaration

UNDERTAKING BY TENDERER ON ANTI – BRIBERY POLICY / CODE OF CONDUCT AND COMPLIANCE PROGRAMME

1. Each Tenderer must submit a statement, as part of the Tender documents, in either of the two given formats which must be signed personally by the Chief Executive Officer or other appropriate senior corporate officer of the Tendering company and, where relevant, of its subsidiary in the Kenya. If a Tender is submitted by a subsidiary, a statement to this effect will also be required of the parent company, signed by its Chief Executive Officer or other appropriate senior corporate officer.
2. Tenderers will also be required to submit similar No-bribery commitments from their subcontractors and consortium partners; the Tenderer may cover the subcontractors and consortium partners in its own statement, provided the Tenderer assumes full responsibility.
3.
 - a) Payment to agents and other third parties shall be limited to appropriate compensation for legitimate services.
 - b) Each Tenderer will make full disclosure in the Tender documentation of the beneficiaries and amounts of all payments made, or intended to be made, to agents or other third parties (including political parties or electoral candidates) relating to the Tender and, if successful, the implementation of the contract.
 - c) The successful Tenderer will also make full disclosure [quarterly or semi- annually] of all payments to agents and other third parties during the execution of the contract.
 - d) Within six months of the completion of the performance of the contract, the successful Tenderer will formally certify that no bribes or other illicit commissions have been paid. The final accounting shall include brief details of the goods and services provided that they are sufficient to establish the legitimacy of the payments made.
 - e) Statements required according to subparagraphs (b) and (d) of this paragraph will have to be certified by the company's Chief Executive Officer, or other appropriate senior corporate officer.
4. Tenders which do not conform to these requirements shall not be considered.
5. If the successful Tenderer fails to comply with its No-bribery commitment, significant sanctions will apply. The sanctions may include all or any of the following:
 - a) Cancellation of the contract;
 - b) Liability for damages to the public authority and/or the unsuccessful competitors in the Tendering possibly in the form of a lump sum representing a pre-set percentage of the contract value (liquidated).
6. Tenderers shall make available, as part of their Tender, copies of their anti-Bribery Policy/Code of Conduct, if any, and of their-general or project - specific - Compliance Program.

-
7. The Government of Kenya has made special arrangements for adequate oversight of the procurement process and the execution of the contract, and has invited civil society and other competent Government Departments to participate in the oversight. Those charged with the oversight responsibility will have full access to all documentation submitted by Tenderers for this contract, and to which in turn all Tenderers and other parties involved or affected by the project shall have full access (provided, however, that no proprietary information concerning a Tenderer may be disclosed to another Tenderer or to the public).

ANTI-CORRUPTION DECLARATION COMMITMENT/ PLEDGE

(Sections 39, 40, 41, 42, 43 & of the PPD Act, 2005)

I/We/Messrs.....

of Street, Building, P O Box.....

.....

Contact/Phone/E mail.....

declare that Public Procurement is based on a free and fair competitive Tendering process which should not be open to abuse.

I/We

declare that I/We will not offer or facilitate, directly or indirectly, any inducement or reward to any public officer, their relations or business associates, in connection with

Tender/Tender No

for or in the subsequent performance of the contract if I/We am/are successful.

Authorized Signature.....

Name and Title of Signatory.....

E. Letter of Acceptance

[Letter head paper of the Procuring Entity]

[date]

To: *[name and address of the Contractor]*

This is to notify you that your Tender dated [date] for execution of the [name of the Contract and identification number, as given in the Contract Data Sheet] for the Contract Price of the equivalent of [amount in numbers and works] [name of currency], as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by us.

We confirm that [insert name proposed by the procuring entity] to be the Adjudicator.

We accept that [name proposed by Tenderer] be appointed as Adjudicator.

Or

We do not accept that [name proposed by Tenderer] be appointed as adjudicator, and by sending a copy of this letter of acceptance to [insert the name of the Appointing Authority], we are hereby requesting [name], the Appointing Authority, to appoint the adjudicator in accordance with Clause 44.1 of the Instructions to Tenderers.

You are hereby instructed to proceed with the execution of the said works in accordance with the Contract documents.

Please return the contract dully signed.

Authorized Signature: _____

Name and Title of Signatory: _____

Name of Agency: _____

Attachment: Form of Contract

F. Form of Contract Agreement

This Agreement, made the [day] day of [month], [year] between [name and address of Procuring Entity] (hereinafter called “the Procuring Entity”) and [name and address of Contractor] (hereinafter called “the Contractor”) of the other part.

Whereas the Procuring Entity is desirous that the Contractor execute [name and identification number of contract] (hereinafter called “the Works”) with the objectives of [insert functional objectives of the works] and the Procuring Entity has accepted the Tender by the Contractor for the execution and completion of such works and the remedying of any defects therein in the sum of [contract price in words and figures] (hereinafter called “Contract Price”).

NOW THIS AGREEMENT WITNESSES AS FOLLOWS:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement;
2. In consideration of the payments to be made by the Procuring Entity to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Procuring Entity to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract;
3. The Procuring Entity hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

In Witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____

Was hereunto affixed in the presence of: _____

Signed, Sealed, and Delivered by the said _____

In the presence of: _____

Tendering Signature of Procuring Entity _____

Binding Signature of Contractor _____

SECTION X: FORMS OF SECURITY

A. Tender Security (Bank or Insurance Guarantee)
(Optional)

*[If required, the **Bank or Insurance Company/Tenderer** shall fill in this Guarantee form in accordance with the instructions indicated in brackets.]*

[insert bank's or insurance company's name, and address of issuing branch or office]

Beneficiary: *[insert name and address of Procuring Entity]*

Date: *[insert date]*

TENDER GUARANTEE No.: *[insert number]*

We have been informed that *[insert name of the Tenderer; if a joint venture, list complete legal names of partners]* (hereinafter called "the Tenderer") has submitted to you its Tender dated *[insert date]* (hereinafter called "the Tender") for the execution of *[insert name of Contract]* under Invitation for Tenders No. *[insert IFT number]* ("the IFT").

Furthermore, we understand that, according to your conditions, Tenders must be supported by a Tender Guarantee.

At the request of the Tenderer, we *[insert name of bank or insurance company]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[insert amount in figures expressed in the currency of the Purchaser's Country or the equivalent amount in an international freely convertible currency]* (*[insert amount in words]*) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Tenderer is in breach of its obligation(s) under the Tender conditions, because the Tenderer;

- a) Has withdrawn its Tender during the period of Tender validity specified by the Tenderer in the Form of Tender; or
- b) Does not accept the correction of errors in accordance with the Instructions to Tenderers (hereinafter "the ITT") of the IFT; or
- c) Having been notified of the acceptance of its Tender by the Procuring Entity during the period of Tender validity;
 - (i). Fails or refuses to execute the Contract Form, if required, or
 - (ii). Fails or refuses to furnish the Performance Security, in accordance with the ITT.

This Guarantee shall expire;

- a) If the Tenderer is the successful Tenderer, upon our receipt of copies of the Contract signed by the Tenderer and of the Performance Security issued to you by the Tenderer; or
- b) If the Tenderer is not the successful Tenderer, upon the earlier of;
 - (i) Our receipt of a copy of your notification to the Tenderer that the Tenderer was unsuccessful, or

~~_____ (ii) Thirty days after the expiration of the Tenderer's Tender. _____~~

Consequently, any demand for payment under this Guarantee must be received by us at the office on or before that date.

[signature(s) of authorized representative(s)]

~~**B. Performance Bank or Insurance Guarantee [Unconditional]**~~

[The **Bank or Insurance Company/successful tenderer** providing the Guarantee shall fill in this form in accordance with the instructions indicated in brackets, if the Procuring Entity requires this type of security.]

[insert bank's or insurance company's name, and address of issuing branch or office]

Beneficiary: *[insert name and address of Procuring Entity]*

Date: *[insert date]*

PERFORMANCE GUARANTEE No.: *[insert Performance Guarantee number]*
We have been informed that *[insert name of Contractor]* (hereinafter called "the Contractor") has entered into Contract No. *[insert reference number of the Contract]* dated with you, for the execution of *[insert name of Contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a Performance Guarantee is required.

At the request of the Contractor, we *[insert name of Bank or Insurance Company]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[insert amount in figures]* (*[insert amount in words]*), such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall expire not later than thirty days from the date of issuance of the Taking-Over Certificate.

[signature(s) of an authorized representative(s) of the Bank or Insurance Company]

C. Bank or Insurance Guarantee for Advance Payment

[Bank's or Insurance Company's Name and Address of Issuing Branch or Office]

Beneficiary: _____ *[Name and Address of Procuring Entity]*

Date: _____

ADVANCE PAYMENT GUARANTEE No.: _____

We have been informed that *[name of Contractor]* (hereinafter called "the Contractor") has entered into Contract No. *[reference number of the contract]* dated _____ with you, for the execution of *[name of contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum *[amount in figures]* (____) *[amount in words]* is to be made against an advance payment guarantee.

At the request of the Contractor, we *[name of Bank or Insurance Company]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[amount in figures]* (_____) *[amount in words]* upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between _____ *[name of Procuring Entity]* and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

No drawing may be made by you under this guarantee until we have received notice in writing from you that an advance payment of the amount listed above has been paid to the Contractor pursuant to the Contract.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that eighty (80) percent of the Contract Price has been certified for payment, or on the ___ day of _____, 2___, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

Yours truly,

Signature and seal: _____

Name of Bank or Insurance Company: _____

Address: _____

Date: _____

**SECTION XI: APPLICATION TO PUBLIC PROCUREMENT
ADMINISTRATIVE REVIEW BOARD**

REPUBLIC OF KENYA

PUBLIC PROCUREMENT ADMINISTRATIVE REVIEW BOARD

APPLICATION NO.....OF.....20.....

BETWEEN

.....APPLICANT

AND

.....RESPONDENT (*Procuring Entity*)

Request for review of the decision of the..... (*Name of the Procuring Entity*) of
.....dated the...day of20.....in the matter of Tender No.....of
.....20...

REQUEST FOR REVIEW

I/We.....,the above named Applicant(s), of address: Physical
address.....Fax No.....Tel. No.....Email, hereby request the Public
Procurement Administrative Review Board to review the whole/part of the above mentioned
decision on the following grounds , namely:-

- 1.
 - 2.
- etc.

By this memorandum, the Applicant requests the Board for an order/orders that: -

- 1.
 - 2.
- etc

SIGNED (Applicant)

Dated on.....day of/...20...

FOR OFFICIAL USE ONLY

Lodged with the Secretary Public Procurement Administrative Review Board on day
of20.....

SIGNED

Board Secretary