



TANA WATER WORKS DEVELOPMENT AGENCY

CONSRUCTION OF WATER TREATMENT WORKS AND REHABILITATION OF WATER SUPPLY PIPELINES FOR MWAI KIBAKI LEVEL VI HOSPITAL IN OTHAYA

TENDER NO: TWWDA/T/026/2022-2023

TENDER DOCUMENTS

JANUARY 2023

Employer

Tana Water Works Development
Agency
P. O. Box 1292 – 10100
NYERI

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ABBREVIATIONS AND ACRONYMS

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| 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 |
| PPADR 2020 | Public Procurement and Asset 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 |

INTRODUCTION

- 1.1 Procurement for works under public-financed projects is carried out in accordance with policies and procedures laid down in The Public Procurement and Asset Disposal Act, 2015.
- 1.2 This Standard Bidding Document (SBD) for procurement of works has been prepared for use by the Procuring Entities in Kenya in the procurement of Works through National Open Tendering (NCB) procedures.
- 1.3 This SBD is mandatory for use in works contracts of a value not exceeding KShs.200 million, as defined in The Public Procurement and Asset Disposal Act, 2015.
- 1.4 The following guidelines should be observed when using the document:
 - (i). Specific details should be furnished in the Invitation for Tenders and in the Contract Data Sheet (where applicable). The Tender document issued to Tenderers should not have blank spaces or options;
 - (ii). The Instructions to Tenderers and the General Conditions of Contract should remain unchanged. Any necessary amendments to these parts should be made through the Tender Data Sheet and Contract Data Sheet respectively;
 - (iii). Information contained in the Invitation for Tenders shall conform to the data and information in the Tender documents to enable prospective Tenderers to decide whether or not to participate in the Tender and shall indicate any important Tender requirements;
 - (iv). The Invitation for Tenders shall be as an advertisement in accordance with the regulations or a letter of invitation addressed to Tenderers who have been prequalified following a request for prequalification.
- 1.5 The cover of the document shall be modified to include:
 - a. Tender number;
 - b. Tender name;
 - c. Name of Procuring Entity;

SECTION I: INVITATION FOR TENDERS (IFT)

1. Tana Water Works Development Agency has funds for use during the financial year(s) 2022/23. It is intended that part of the proceeds of the fund will be used to cover eligible payments under the contract for the **construction of water treatment works and rehabilitation of water supply pipelines for Mwai Kibaki level VI hospital in Othaya, Nyeri county.**
2. TWWDA, the Procuring Entity now invites sealed Tenders from eligible contractors registered with NCA 6 and above and Ministry of Water, Irrigation and Sanitation Class “D” for carrying out **construction of water treatment works and rehabilitation of water supply pipelines for Mwai Kibaki level VI hospital in Othaya, Nyeri county.**
3. Tendering will be conducted through the Open tender procedures specified in the Public Procurement and Asset Disposal Act, 2015 and is open to all Tenderers as defined in the Regulations. Any prequalified firm/s in this category of works/service/s is also encouraged to tender for the works whereof their bids shall be accorded appropriate exceptions in accordance with the procurement laws.
4. Interested eligible Tenderers may obtain further information and inspect the Tendering Documents at the offices of the Tana Water Works Development Agency, Maji House, along Baden Powell Road, P.O. Box 1292-10100, Nyeri from 8.00 a.m. to 5.00 p.m. from Mondays to Thursdays and from 8:00 am to 4:00 pm on Fridays except on public holidays or from the website www.tanawwda.go.ke. at their convenience.
5. A complete set of Tender Document(s) can be obtained for free on the IFMIS Tender Portal <http://supplier.treasury.go.ke> and on Tana Water Works Development Agency website www.tanawwda.go.ke. or from TWWDA’s Procurement Office during normal working hours upon payment of non-refundable fee of Kshs1,000 cash or Bankers Cheque in favour of Tana Water Works Development Agency.
6. Two (2) hard copies (one original and one copy) tender documents must be submitted enclosed in plain sealed envelope marked with the tender name and tender reference number, addressed to the **Chief Executive Officer, Tana Water Works Development Agency P.O. Box 1292 – 00100 Nyeri, Maji House, Baden Powell Road** and deposited in the **tender Box at Tana Water Works Development Agency** at the reception, so as to be received on or before **Wednesday, 15th February 2023** at 10.00am and opened there after at TWWDA Board Room in the presence of the Bidders or their representatives who choose to attend.
7. Late or incomplete Tenders shall not be accepted.

SECTION II: INSTRUCTIONS TO TENDERERS (ITT)

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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**.

 - 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 Asset Disposal Act, 2015 and The Public Procurement and Asset Disposal Regulations, 2020 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.

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 design as 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**.

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 |
| | <ul style="list-style-type: none"> • Form of Tender • Appendix to Tender • Confidential Business Questionnaire • Integrity Declaration • Letter of Acceptance • Form of Contract Agreement |
| Section X | Forms of Security |
| | <ul style="list-style-type: none"> • 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.

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 not 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

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 for completing and submitting 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:

- 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 **Tender Data Sheet**.
- 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.
- 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.

18. Tender Validity Period

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.

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.

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.

19. Tender Security and Tender Securing Declaration

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 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 the following form:

a) A **Bank Guarantee**

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

Submission of Tenders

21. Sealing and Marking of Tenders

21.1 The Tenderer shall seal the original copy of the Tender in an envelope, duly marked as “**ORIGINAL**”. **A copy will also be submitted.** 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.
- 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.

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.

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 figures 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 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.

30. Conversion to Single Currency

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**.

31. Comparison of Tenders

31.1 The Procuring Entity shall evaluate and compare only the Tenders determined to be substantially responsive in accordance with ITT Clause 28.

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.

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.

32. National Preference

32.1 In the evaluation of Tenders, the Procuring Entity shall apply exclusive preference to citizens of Kenya where:

a) The funding is 100% from the Government of Kenya or a Kenyan body;

b) The amounts are below the prescribed threshold of KShs.200 million;

32.2 To qualify for the preference, the candidate shall provide evidence of eligibility by:

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.

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 Tender and to Reject any or all Tenders**
- 37.1** Notwithstanding ITT Clause 35, the Procuring Entity reserves the right to accept or reject any 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.

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 Asset Disposal Act, 2015 and The Public Procurement and Asset Disposal Regulations, 2020, 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,2015;
- 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 Asset Disposal Regulations, 2020 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,2020, 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) Annuling 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

E. Opening and Evaluation of Tenders

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 TANA WATER WORKS DEVELOPMENT AGENCY |
| 2. | 1.1 | Name of Project is CONSTRUCTION OF WATER TREATMENT WORKS AND REHABILITATION OF WATER SUPPLY PIPELINES FOR MWAI KIBAKI LEVEL VI HOSPITAL IN OTHAYA, NYERI COUNTY. |
| 3. | 1.2 | The expected completion date of the works is 6 months from issuance of commencement letter |
| 4. | 1.3 | The Objectives of the Project are: Improve the water quality for the Mwai Kibaki - Othaya Level VI hospital and other health institutions & ensure constant water supply in the project area. |
| 5. | 2.1 | Name of financing institution is GOVERNMENT OF KENYA Name of the Procuring Entity is TANA WATER WOKS DEVELOPMENT AGENCY Financial Year 2022– 2023 Describe works under the contracts: |
| 6. | 2.2 | The loan/ credit number is N/A |
| 7. | 5.1 | Alternative Tenders are <i>“not allowed”</i> in this Tender. |

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| 8. | 5.2 | Alternative time for completion NOT applicable |
| 9. | 3.1 | Only Tenderers registered as Water Works Contractors in Class NCA 6 and above with the National Construction Authority and Ministry of Water and Irrigation Class “D” and above for water works construction. |
| 10. | 7.3 | Pre-Tender site meeting will take place at the site on Friday 27th January, 2023 at 9.30 a.m. The place of converging shall be Othaya-Mukurweini Water and Sanitation Company Limited (OMWASCO) office, Othaya in Nyeri County |
| 11. | 7.5 | The minutes of the pre-Tender meeting will be transmitted within 7 days and these minutes shall form part of the contract agreement |
| | 7.6 | Non-attendance at the pre-tender meeting will result in disqualification |

B. Tendering Documents

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|------------|------------|---|
| 12. | 8.2 | The number of copies to be completed and returned with the Tender is 2 copies (One Original and One Copy) |
| 13. | 8.1 | Address for clarification of Tendering Document ceo@tanawwwda.go.ke |
| 14. | 8.2 | Period to Respond to request for clarification by the Procuring Entity 5 days Period Prior to deadline for submission of Tenders for Tenderers to request clarification 7 days |

C. Preparation of Tenders

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| 15. | 11.1 | Language of Tender and all correspondence shall be English |
|------------|-------------|---|

| | | |
|-----|------|---|
| 16. | 13.3 | <p>Other information or materials required to be completed and submitted by Tenderers:</p> <p>Mandatory Requirements: -</p> <p>a) Copies of original documents defining the constitution or legal status, place of registration, and principal, place of business; written power of attorney authorizing the signatory of the Tender to commit the Tenderer.</p> <p>b) The minimum required annual volume of construction work for the successful Tenderer in any of the last 3 years shall be: KShs.150 Million</p> <p>c) Evidence of experience as prime contractor in the construction of at least four projects of a nature and complexity equivalent to the Works of this Contract in the last three years (to comply with this requirement, the works should be at least 75 percent complete).</p> <p>d) The essential equipment to be made available for the Contract by the successful Tenderer (proposals for timely acquisition or own, lease, hire, etc) shall be:</p> <ul style="list-style-type: none"> i) Concrete mixer ii) HDPE Butt Fusion Machine (50 – 315 mm Ø) iii) Poker vibrators iv) Lorry v) Excavator or backhoe vi) Compressor CP with 2 jacks <p>e) A Project Manager with a minimum of 5 years’ experience in works of an equivalent nature and volume.</p> <p>f) Engineer/ Site Agent with a minimum of 4 years’ experience in works of an equivalent nature and volume and should be registered with EBK or KETRB.</p> <p>g) Inspector of works with a minimum of 3 years’ experience in works of an equivalent nature and volume</p> <p>h) Surveyor with a minimum of 3 years’ experience in works of an equivalent nature and volume</p> <p>i) Evidence of adequate working capital for this contract.</p> <p>j) Information regarding litigation, current and past</p> |
| 17. | 13.4 | In the case of joint venture each partner shall submit information required under Clause ITT Clause 13.4. |
| 18. | 16.4 | The price shall be Fixed Information to be submitted with the Tender are as per the questionnaire |
| 19. | 17.1 | The currency in which the prices shall be quoted shall be: Kenyan Shillings |

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|-----|--------------|--|
| 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 180 days from the date of submission. |
| 22. | 19.1 | The amount of Tender Security Amount shall be ksh 250,000 in form of a Bank Guarantee. |
| 23. | 20.1 | In addition to the original of the Tender, the Tenderer should submit 1 copy of the Tender. |
| 24. | 20.2 | Written confirmation of authorization of Power of Attorney |

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|---------------------------------|---------|--|
| D. Submission of Tenders | | |
| 25. | 21.2 a) | Tenders shall be submitted to: Tana Water Works Development Agency, P.O. Box 1292 - 10100 Maji House, Baden Powell Road, NYERI. |
| 26. | 21.2 b) | Project name CONSTRUCTION OF WATER TREATMENT WORKS AND REHABILITATION OF WATER SUPPLY PIPELINES FOR MWAI KIBAKI LEVEL VI HOSPITAL IN OTHAYA, NYERI COUNTY Tender number: TWWDA/T/026/2022 – 2023 Time and date for submission Wednesday, 15th February, 2023 at 10.00am. |
| 27. | 22.1 | The deadline for Tender submission is a) Day: Wednesday b) Date 15/02/2023 c) Time at 10.00 am. |

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| | 28. | 22.3 | The extension of the deadline (if any) for submission of Tenders shall be made not later than 7 days before the expiry of the original deadline. |
| 29. | 25.1 | <p>The Tender opening shall take place at:</p> <p>Tana Water Works Development Agency Building/Plot No. Maji House Floor/Room No. Board Room City/Town: Nyeri Country: Kenya Date: 15/02/2023 Time 10.15am</p> | |
| 30. | 32.3 | Additional Preference <i>N/A</i> | |
| 31. | 34.1 | Post-qualification shall be undertaken for all firms which have never been engaged by TWWDA | |
| 32. | 38.1 | Percentage for quantities increase or decrease should not exceed 25% | |
| F. Award of Contract | | | |
| 33. | 41.1 | The amount of Performance Security shall be 10% of the contract price in the form a Bank Guarantee | |
| 34. | 42.1 | The Advance Payment shall NOT BE applicable | |
| 35. | 43.1 | The proposed adjudicator for the project is from name recommended by the Kenya chapter of chartered institute of arbitrators, P.O Box 50163-00200, Nairobi | |
| G. Review of Procurement Decisions | | | |
| 37. | 46.1 | <p>The address for submitting appeals to Administrative Review Board:</p> <p>The Secretary, Public Procurement Administrative Review Board, The Public Procurement Regulatory Authority, 10th 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</p> | |

SECTION IV: GENERAL CONDITIONS OF CONTRACT

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- **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 def 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.

Day works 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.
- 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;
- (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 EACC/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, 2015.

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, 2015. 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 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.

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 a 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.

Time Control

- 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.
- 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.

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.
- 36.2 The procuring entity through the Accounting Officer will, upon commencement of the project works, appoint a project/contract Implementation team, pursuant to the PPAD Act 2015, section 151.
- 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.

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 90 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.

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;

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

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 day work 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'.

$$F = PnxC$$

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-Clauseand
- (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 paid 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 day works 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 day works subject to obtaining signed Day works 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.

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- 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)

67. 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 Tana Water Works Development Agency P.O. Box 1292 - 10100 Maji House, Baden Powell Road, NYERI.</p> <p>The Adjudicator is Chairman, Institute of Engineers of Kenya</p> <p>The Defects Liability Period is 12 Months</p> <p>The Project Manager is CHIEF MANAGER, TECHNICAL SERVICES.</p> <p>The name and identification number of the Contract is. CONSTRUCTION OF WATER TREATMENT WORKS AND REHABILITATION OF WATER SUPPLY PIPELINES FOR MWAI KIBAKI LEVEL VI HOSPITAL IN OTHAYA, NYERI COUNTY</p> <p>Contract No: TWWDA/T/026/2022 – 2023</p> <p>The Works consist of Construction of Water Treatment Works and Rehabilitation of Water Supply Pipelines For Mwai Kibaki Level VI Hospital In Othaya, Nyeri County as described in the BOQ.</p> <p>The objective of the contract is to Improve the water quality for the Mwai Kibaki - Othaya Level VI hospital and other health institutions & ensure constant water supply in the project area.</p> |

| | | |
|-----------|---------------|---|
| | | <p>The Start Date shall be 14 Days on Issuance of Commencement Letter.</p> <p>The Intended Completion Date for the whole of the Works shall be 6 Months from commencement.</p> <p>The following documents also form part of the Contract:</p> <ol style="list-style-type: none"> 1. Contract Agreement 2. Letter of Acceptance 3. Form of Tender 4. Tender Data Sheet 5. Contract Data Sheet 6. Conditions of Contract 7. Specifications 8. Drawings 9. Priced Bills of Quantities <p>The Site is located in Kaharo; Othaya Constituency, Nyeri County.</p> |
| 2. | 2.2 | Indicate whether there is sectional completion: N/A |
| 3. | 2.3(9) | List other documents that form part of the contract if any: See CDS Clause 1 above a) Pre-tender site visit minutes b) Pre-contract signing negotiations minutes c) Any addenda issued |
| 4. | 3.1 | The language of the Contract documents is English. The law that applies to the Contract is the Kenyan Law. |
| 5. | 9.1 | Include the Schedule of Other Contractors, if any. |
| 6. | 10.1 | Include the Schedule of Key Personnel. a) A Project Manager with a minimum of 5 years' experience in works of an equivalent nature and volume. b) Engineer/ Site Agent with a minimum of 4 years' experience in works of an equivalent nature and volume c) Inspector of works with a minimum of 3 years' experience in works of an equivalent nature and volume d) Surveyor with a minimum of 3years' experience in works of an equivalent nature and volume |

| | | |
|------------|------------------------|--|
| 7. | 14.1 | The minimum insurance covers shall be: <ul style="list-style-type: none"> (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. |
| 8. | 15.1 | Site Investigation Reports available to the Tenderers are: N/A |
| 9. | 22.4 | The other measures include: <ul style="list-style-type: none"> a. Minimising the number of migrant workers employed on the project and household in the site camp b. Providing access to voluntary counselling and testing (VCT) c. Providing psychological support and health care including prevention and treatment of opportunistic infections for workers infected and affected, as well as their families d. Providing condoms (male and female) to workers e. Provide hand washing Facility, Masks, sanitizers to workers and observe GOK Protocols on Covid -19 |
| 10. | 24.1 & 47.1 | The Site Possession Date shall be within 14 days of issuance of Commencement letter. |

| | | |
|------------------------|-------------|--|
| 12. | 28.3 | Arbitration will take place at in accordance with rules and regulations published in Kenya in accordance with the provisions of the Arbitration Act of the Laws of Kenya or any other enactment replacing or modifying the same for the time being in force, by a single arbitrator appointed by the Chairman of the Engineer's Registration Board of Kenya on application by either party |
| 13. | 29.1 | Appointing Authority for the Adjudicator: Chairman of the Engineer's Registration Board of Kenya |
| B. Time Control | | |
| 14. | 30.1 | The Contractor shall Submit a Programme for the Works within 14 days of delivery of the Letter of Acceptance. |

| | | |
|---------------------------|------------------|--|
| | | |
| 15. | 30.3 | The period between Programme updates is 28 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: Ksh 5,000 per day . |
| C. Quality Control | | |
| 17. | 38.1 | The Defects Liability Period is 12 Months . |
| D. Cost Control | | |
| 18. | 45.7 | Minimum Amount of Interim Payment Certificate will be 20% of the Contract Amount |
| 19. | 46.1 | The interest rate shall be N/A above prevailing interest rate for commercial borrowing from the contractor's bank |
| 20. | 47.1(a) | The Site Possession Date shall be within 7 days of issuance of the commencement letter . |
| 21. | 50 | The contract is not subject to price adjustment. |
| 22. | 51.1 | The amount of retention is 10% of value of works of Interim Payment Certificate'. Limit of retention will be 10% of contract price. |
| 23. | 52.1 | The rate of liquidated damages is 0.15 % of contract price per day after the expiry of the contract period. |
| | 52.1 62.2 (g) | The maximum amount of liquidated damages is 7.5% of Contract Price |
| 24. | 53.1 | The bonus for early completion is N/A |
| 25. | 54.1 | The amount of advance payment shall be N/A |
| 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 30 days after completion: |
| 28. | 61.2 | The amount to be withheld by the Project Manager in the case the contractor does not submit as built drawings is: ksh 200,000. 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 10%. |

SECTION VI: TECHNICAL SPECIFICATIONS

TECHNICAL 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 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 works is **located in Kaharo; Othaya Constituency, Nyeri county.**

1.1.2 Scope of Works

The Works consist of **Construction of Water Treatment Works and Rehabilitation of Water Supply Pipelines For Mwai Kibaki Level VI Hospital In Othaya, Nyeri County as described in the BOQ.**

1.2 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) Detailed 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.

1.6 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 36 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.

A Provisional Sum item has been included in Bills of Quantities for testing of materials and workmanship as directed by the Engineer at the Independent Laboratory.

The Contractor will be reimbursed receipted cost of testing carried out by the laboratory as the work progresses.

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 Sub-Contractor'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 on 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.

1.16 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 1962 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.

1.26 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 be 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 advise 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:

| <u>Description</u> | <u>No.</u> |
|--|------------|
| (a) 2 m ranging rods | 6 |
| (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 source 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 while 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 26 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.

1.46 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: -

- i) 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 water-borne 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 instalment 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, soak ways 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.

2. SITE CLEARANCE

2.1 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 except services mentioned in Clause 2.13 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.

2.2 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.

2.3 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.

3. EARTHWORKS.

3.1 General

Excavation shall be made to such lengths, depths and inclinations as may be necessary for construction of the works or as shown on the drawings or as the Engineer may direct.

3.2 Definitions of Materials

For the purpose of these specifications, materials of earthworks are defined as follows:

- (a) **Rock:** Solid mass of mineral material, exceeding 0.25 m cubic metres in volume, such hardness and texture that it cannot be broken down with a hand-drifting pick.
- (b) **Common Material:** All earth materials which do not meet the common requirement of rock as defined in "Rock" above.

3.3 Classification of Excavation

The Engineer or his representative and the Contractor or his representative shall be present during classification of materials.

Where the terms "Rock excavation" and "Common excavation" or "Excavation" are used in these specifications the following definitions shall apply.

3.3.1 Rock Excavation

Rock excavation includes all solid rock in place which cannot be removed until loosened by blasting, barring, wedging, and all boulders or detached pieces of solid rock more than 0.25 cubic metres in volume. Solid rock under this class, is defined as sound rock of such hardness and texture that it cannot be loosened or broken down by hand-drifting picks

All materials containing more than 50 per cent by volume of boulders exceeding 0.25 cubic metre in volume shall be classified as rock excavation.

3.3.2 Common Excavation

Common excavation includes all material other than rock excavation including, but not restricted to earth, gravel, and also such hard and soft or disintegrated rock together with all boulders or detached pieces of solid rock not exceeding 0.5 cubic metre in volume.

3.4 Stripping of Topsoil

3.4.1 Stripping

Stripping shall consist of removing transporting and disposing of topsoil, stumps, roots buried logs, debris humus and similar objectionable matter.

Areas to be stripped are all areas required for permanent constructional works, borrow-pits and embankment fills.

The limits of stripping shall extend 2 metres beyond the limits of excavation or toes of fills. The depth of stripping shall normally be 0.2m, but deeper stripping might be needed to remove stumps

3.4.2 Disposal

Materials from stripping suitable as topsoil shall be spread in approved areas. All other non-combustible materials shall be buried in approved disposal area, covered with minimum of 0.5 m of excavation spoil. These disposal areas shall be left with neatly graded surfaces and stable slopes that assure drainage. Alternatively, the non-combustible material shall be removed from the area by the Contractor.

3.5 Excavation in Open Cut

3.5.1 General

All open cut excavation shall be performed in accordance with this section to the lines, grades and dimensions shown on the drawings or as directed by the Engineer. The Engineer reserves his right to at any time during the progress of the work to vary the slopes or dimensions of the excavation from those previously specified.

All necessary precautions shall be taken to preserve the material below and beyond the lines of all excavation in the soundest possible condition. Any damage to the work due to the Contractor's operations, including shattering of the material beyond the required excavation lines, shall be repaired at the expense of and by the Contractor. Any and all excess excavation for the convenience of the Contractor for any purpose or reason, except as may be ordered in writing by the Engineer and whether or not due to the fault of the contractor shall be at the expense of the Contractor. Where required to complete the work, all such excess excavation and over-excavation shall be filled with compacted concrete Grade concrete 10 furnished and placed at the expenses of and by the Contractor.

All excavations for structure foundations shall be performed in the dry.

If excavations are carried out in roads, footpaths, separators or within 5m of buildings, the contractor is requested to execute the work in a way that will minimise damage and disturbances. In general vertically sided excavation will

be required in such places and the necessary timbering or other support must be provided. The Undercutting of excavation sides will not be permitted.

The Engineer reserves his right to direct the contractor as to the length of trenches or parts of bulk excavations which shall be opened up at any one time. In case of excavations in roads, and in other cases which in the opinion of the Engineer are likely to cause interference to the public, the Contractor shall organize his operations in such a way as to reduce to a minimum the interval between opening up and Backfilling the excavations.

No permanent work shall commence until the Engineer has inspected and approved the excavation.

3.5.2 Mechanical Excavation

- (a) A mechanical excavator shall be employed only if the sub-Soil is suitable and will allow timbering of trenches or other excavations to be kept sufficiently closed up to ensure that no slips fall or disturbance of the ground takes place or there are no pipes, cables, mains or other services or property which may be disturbed or damaged by its use.
- (b) When mechanical excavators are used, a sufficient depth Of materials shall be left over the bottom of the excavation to ensure that the ground at finished excavation level is not damaged or disturbed in any way. The excavations shall then be completed by hand to the finished levels required.

3.5.3 Rock Excavation

The Contractor shall notify the Engineer on each occasion when he considers that he is entitled to payment of excavation in rock and shall not fill in any excavation concerned, until it has been inspected by the Engineer.

No payment for excavation in rock shall be made unless the Engineer has inspected the excavation and certified in writing the quantities involved.

The Contractor shall trim all rock faces in cutting according to the dimensions shown on the drawings and upon completion leave them safe from rock falls to the satisfaction of the Engineer.

On any work requiring the use of explosives, the Contractor shall employ men experienced in blasting and these men must be in possession of current blasting certificate. The purchase, transport, storage and use of explosives 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 rate for excavation and quarrying, for all expenses incurred in meeting these 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, and the contractor shall take all practical precautions for the protection of persons, properties and the Works.

Slopes shattered or loosened by blasting shall be taken down at the expenses of and by the Contractor. The Contractor's blasting and other operations in excavation shall be such that they will yield as much suitable material as possible for the construction.

3.5.4 Foundation for Structures

(a) **Common materials:** The bottom and site slopes of common material upon or against which concrete is to be placed shall be finished accurately to the established lines and grades, and loose materials on surfaces so prepared shall be moistened with water and stamped or rolled with suitable tools and equipment to form a firm foundation for the concrete structure. If, at any point in common material, material is excavated beyond the established excavation lines, for any reason except by written orders from excavation lines, for reason except by written orders from the Engineer, then the over-excavation resulting voids shall be filled with consolidated concrete Grade 10 at the Contractors expenses. If the excavation is carried out in advance a protective layer of 150 mm thickness shall be left above the foundation level until immediately before the Contractor is ready to pour the blinding concrete.

(b) **Rock materials:** The bottom and side slopes of rock material upon or against which concrete is to be placed shall be excavated to the required dimensions as shown on the drawings or established by the Engineer. No material will be permitted to extend within the neat lines of the structure. If, at any point in the rock material, material is excavated beyond limits required to receive the structure, the additional excavation shall be filled solidly with concrete Grade 10.

All soft or loose material shall be removed by the use of stiff brooms, picks, hammer or jets and any cavities backfilled with concrete Grade 10, grout or compacted rock fill as directed.

(c) **Level and Dimensions of foundations:** Levels and dimensions of foundation shown on the drawings may be changed by the Engineer to suit actual site conditions. The additional volume shall be measured net and paid according to the rate in the Bills of Quantities.

3.5.5. Trench Excavations for Pipe Laying

All surface material including top soil which differs in any nature whatsoever from the sub-strata, shall in every case be carefully set aside and stored separately from other excavated material. No extra claim will be allowed for setting aside surface mater or topsoil for later use.

Trench excavation shall be carried out with great care, true to line and gradient and as near as practicable to the size required for construction of the permanent work. Nowhere shall the external dimensions of the excavations be less than

the dimensions of the permanent work shown on the Drawings or directed by the Engineer.

If the bottom of the excavation becomes weathered prior to pipe laying, due to fault of the contractor, the weather soil shall be replaced with suitable compacted material to the original formation level at the contractor's expenses. The pipe trench shall be excavated to a depth of 150 mm below the invert level of the pipe and refilled with sand, gravel or other selected material free from stones and well rammed in order to provide a smooth bed for the pipes.

Where concrete pipes are laid in concrete, the pipe trench shall be excavated to a depth of 150 mm below the invert level of the pipe and the width shall be equal to breadth of concrete bedding for the pipes plus 150 mm on either side.

Excavation for pipe trenches shall be of sufficient depth to give a minimum cover of 800 mm over the top of the pipe. Where pipes/sewers cross under roads, minimum cover shall be 1 m or such cover as may be directed by the Road Authority.

Where the pipeline is required to be laid at depth, which does not satisfy the minimum cover conditions set out above, the ground surface shall be brought up to the required level by banking the backfill or as directed by the Engineer.

No pipes shall be laid and no excavation filled in or covered with concrete until the formation has been inspected and permission to proceed with the work obtained.

Where P.V.C. or Polythene pipes are being laid, the bottom of the trench must be completely free from stones, and a smooth bed of fine material must be provided. Where the bed of the trench for P.V.C or polythene pipes is excavated in rock, it must be excavated to a depth of not less than 100mm below the bottom of the pipe, and refilled with selected fine granular material to make a smooth bed for the pipe.

The width of the trench to be excavated will depend on the size and type of pipe being laid. Sufficient width must be excavated to allow the pipe to be correctly bedded and aligned, and to allow for the joints to be correctly made. Generally, the grade of the pipe will conform to the grade of the ground, but the excavation must be deepened where necessary to avoid backfill in any section. Generally, the pipeline will slope downwards. Minimum gradients are shown on the drawings.

Any Excavated material stored on site for Backfilling or other purpose shall be deposited alongside the excavation at a minimum distance of 0.5m on such a manner that it will cause no damage and as little inconvenience as possible.

3.5.5 Timbering of Excavations

The Contractor shall supply and fix aside the limits of the permanent works all the timber necessary for support of sides and bottoms of the excavation, for security of adjacent structures and properties and for every other purpose for which it may be required, all to the satisfaction of the Engineer. The Contractor shall maintain such supports until in the opinion of the Engineer, the works is sufficiently advanced to permit the withdrawal of the support. Such withdrawal shall be executed only under the personal supervision of a competent foreman.

The Engineer may order excavations to be timbered or to be closed timbered or may order timbering to be driven ahead of the excavation, or may order the adoption of any other method of supporting the sides and bottoms of the excavation as may appear to be necessary, and the Contractor shall adopt and shall make no charge for executing the adopted method.

The contractor shall be responsible for any injury to the work and any consequential damage caused by or arising out of the insufficiency of the support he provides for his excavations or caused by or arising out of the removal of that support, and any advice permission approval or instruction given by the Engineer relative to the support or removal thereof shall not relieve the Contractor of his responsibility.

Any instruction given by the Engineer will be directed to the provision of stronger support than that proposed by the contractor, and will be given only when, in the opinion of the Engineer, the support proposed by the Contractor is insufficient.

Where timber has been used in excavation any such timber left in position shall be at the expense of the contractor except where the Engineer has ordered the timber to be left in place with the prior approval of the Engineer. The timber approved or ordered to be left in place will be paid for at the rates entered in the Bills of Quantities.

For the purpose of this Clause the words "timber" and timbering be construed to include trench sheeting and steel or concrete sheet piling or any other means adopted by the Contractor for supporting excavations.

3.5.6. Excavation to be kept Free from Water

Where excavations are required below the existing water level, the Contractor shall make arrangements to keep the excavation dry and shall produce drawings and written explanations of the method to be used to enable the Engineer to determine the adequacy of the method, before commencing the excavation.

The Contractor shall give due regard to the possibility of floods and provide all pumps, timbering, coffer dams, sheet piling and other equipment necessary for keeping the excavations free from water.

Every precaution shall be taken not to diminish the bearing capacity of the soil below foundation. Well points or pump pits are to be outside the foundation area to prevent flows in upward direction.

All sumps and drains are to be filled in or otherwise made good as directed by the Engineer on completion of the relevant part of the works.

The costs of all the above precautions shall be allowed for in the rates inserted in the Bills of Quantities.

3.5.7. Refilling Excavations

No Backfilling or refilling shall commence without the Engineer's approval

The refilling of excavation shall be commenced as soon as practicable after the permanent works have been tested where so required and inspected and approved by the Engineer. In particular, the back filling of trenches shall be carried out expeditiously to reduce lengths of trenches open at any one time.

As soon as P.V.C. or polythene pipes are laid and joined in their final positions, they should be protected from possible damage by carefully back filling of line with granular material brought up to about 150 mm over the top of the pipe, for the full width of the trench, and well compacted.

Joints must be left open for inspection until the pressure test is completed.

Backfilling shall be executed with selected materials in 150mm layers (300 mm layers if a mechanical hammer is used) each layer being well rammed and watered to obtain maximum compaction. Care shall be taken to ensure that no stone or other work, is placed within 300 mm of such work.

Water in excess shall not be used in settling of the back filling.

Back filling over steel pipes shall be generally as described above, except that the initial protective filling around the pipe is not necessary.

Regardless of the means of backfilling adopted, it is the Contractor's responsibility to ensure that he satisfactorily backfills all excavations and causes no damage to permanent work or adjacent structures, and he shall at his own expense take all steps necessary to comply with this obligation.

The Contractor shall at all times be responsible for damage caused to permanent work through his back filling operations or throughout his premature opening to traffic of a backfilled surface.

3.5.9 Reinstatement of Surfaces

Generally, all trenches and backfilled excavations shall be reinstated to equal surface as before excavation.

Trenches in any existing road shall be refilled to the level of natural soil below the road with sub-soil in 75mm layers, each layer being carefully tamped with

hammers. The remaining top layer shall be filled to the road surface with materials equal in type, quantity and compaction to materials used for the existing road.

The trench shall then be left to settle for 30 days. At the expiration of this period, the surface shall be made up to level and tamped or rolled to the approval of the Engineer, who will decide on the particular surfacing employed in accordance with the existing surface of the road.

Before expiration of the maintenance period, the Contractor shall make good any defaults in reinstatements.

3.5.10 Removal of Surplus Excavated

Excavated material, which is not added either for backfilling trenches or other excavations or use in embankments or otherwise, shall be removed and disposed of to tipping places obtained by the Contractor. All rubbish and waste material shall similarly be removed by the Contractor. All surplus excavated material shall be spread and levelled in the tipping places in accordance with such directions as the Engineer may give, and the Contractor's rate for disposal shall include for the costs of such operations.

The contractor shall take every practical precaution against causing any nuisance, damage, injury or inconvenience in handling stacking, carting or disposal of excavated materials or any other operations matter or thing in connection therewith.

No excavated material shall be placed in any position here it may be washed away or may be liable to fall or spread into any private property or across a road or footpath, should such occur, the Contractor shall forthwith remove the same at his own costs.

Should the Engineer direct the Contractor to tip surplus excavated materials in a particular place (other than the tipping places obtained by the Contractor) the Contractor shall abide by such instruction and shall make no charge in consequence thereof unless the place specified entails a longer haul than what would be incurred by tipping at the place or places obtained by the Contractor.

Where excavation lines are not shown on the drawings, the excavation will be measured to the most practicable lines, grades, and dimensions as directed by the Engineer.

In the case of bulk excavations, the Contractor shall unless otherwise directed by the Engineer prior to the commencement of any excavation prepare grid plans of the various sites showing the existing ground levels at intervals of not more than 10m. For any particular part of excavation the mean ground level shall be determined from the above aforesaid grid plan and the depth shall be calculated from the above mean ground level.

Pipe trenches are measured in linear metres as one item for each pipe size with a minimum width and depth as indicated on the drawings. Extra excavation for deeper trenches will be measured on cubic metres and paid for where ordered by the Engineer.

Rates for excavation shall include for all labour, equipment; preparation of bottoms for receiving concrete or granular soul beds; for forming joint holes where applicable, for preserving surfaces of excavation; for returning excavated material as rammed backfill and for carting away surplus to dump.

Rate for excavation shall also include for working in a manner that causes no interference with the stability of adjacent structure and properties, for the cost of all timber or other support left in place unless ordered or approved to left in place unless ordered or approved to be left in place by the Engineer; for ground stabilization by means of de-watering, chemical processed or other approved method whether effected by floods, storms or otherwise for the provision and sealing of temporary channels, drains and dumps; ;for temporarily storing excavated materials required for backfill or other purposes; for temporarily supporting, protecting, diverting, maintaining utility services; for maintaining flows in sewers and water found necessary for the proper execution and safety of the works.

Further, the rates in the Bills of Quantities for excavation in open cut shall include the entire cost of:

- (a) Transportation of material from the excavation to points Of final use, to disposal areas, to temporary stockpiles and from temporarily stockpiles to points of final use.
- (b) Rehandling excavated materials which have been deposited temporarily in stockpiles.
- (c) Removal of oversize materials from otherwise suitable material disposal for the same.

No extra payment shall be made to the Contractor for working in confined space or if the position of the works as set out or ordered will not allow the use of mechanical excavators.

50% of the rate for excavation, backfilling and disposal of surplus material will become due for payment when trenches have been backfilled to a dept of 150mm over the pipe barrel. Excavation for structure foundations will be authorized for payment of 50% of the rate, when the excavation has been approved and the surface blinded.

3.6 Borrow Pits

No borrow pits will be allowed to be opened on the site unless permission in writing has been obtained from the Engineer.

Before the excavation of an approved borrow area is commenced, the Contractor shall clear the surface and strip the topsoil in accordance with Clause 3 & 4.4.

Borrow excavation shall be regular in width and shape and shall be properly graded and drained and finished with neatly trimmed slope, and if so directed soiled and grassed.

The Contractor shall not be entitled to any additional allowance above the unit prices on accounts of any changes ordered by the amounts of materials to be secured from any borrow area, or on account of the designation by the Engineer of the various portions of the borrow areas from which materials are to be obtained, or on account of the depths of cut which are required to be made.

Measurement for payment of excavation in borrows areas will only include for the quantities of materials utilized for construction of embankments etc. Any costs of excess excavated material, except if directed by the Engineer shall be borne fully by the contractor.

3.6 Hardcore Filling

Hardcore fill shall consist of clean hard broken stone or rubble with measurements not exceeding 150mm in any one direction with sufficient murrum added to fill the interstices. The hardcore shall be well packed, rammed and where possible rolled with a 5 ton a roller. Where rolling is impossible, compaction shall be by hand or by mechanical tampers. Before any concrete is laid on hardcore, the hardcore shall be levelled and blinded with fine stone chipping, rolled and watered as necessary. Hardcore filling is measured after compaction.

3.8 Earth Filling

3.8.1 General

Earth not suitable to be used in filling may at any time be rejected by the Engineer. If there is a deficit of soil, the Contractor shall from approved borrow pits supply selected material in the ordered amount.

Before commencement of filling the topsoil shall be removed, if so ordered by the Engineer. The removal of this layer will be separately priced in the Bills of Quantities. The Contractor shall carry out the forming of embankments in accordance with the drawing and shall adhere to the slopes, levels, depths and heights shown thereof.

Before earth filling, the sand or gravel bedding of the pipes, according to the drawings shall be made. Soil filled to 500mm over the top of pipes shall be free from stones and be filled in by hand with the utmost care to avoid replacement of pipes.

3.8.2 Compaction of Fill

The 500mm fill over the pipe shall be compacted carefully by hand. In other areas, after removal of topsoil as specified, fill material shall be spread in even layers over the full width of the area to be filled. Each layer shall not exceed 300mm in thickness after compaction.

The water content of the earth fill material prior to and during compaction shall be distributed uniformly throughout each layer of the material. The allowable ranges of placement water content are based on design considerations. In general, the average placement water content will be required to be maintained at the Proctor Laboratory Standard Optimum Condition. This standard optimum water content is defined as "That water content which will result in a maximum dry unit weight of the soil when subjected to the standard Proctor Compaction Test".

Proctor compaction tests are to be carried out in accordance with BS 1377 and the Contractor shall provide the Engineer with facilities to carry out such tests, or cover the cost of tests carried out elsewhere.

As far as practicable, the material shall be brought to the proper water content in the borrow pit before excavation. Supplementary water, if required, shall be added to the material by sprinkling on the earth fill and shall be mixed uniformly throughout the layer.

Compaction of fill shall be carried out to 95 per cent standard proctor if not otherwise indicated on the drawings.

In case of unsatisfactory compaction test results, the Contractor shall re-compact or remove the fill to the satisfaction of the Engineer.

The number of tests to be made shall be agreed upon by the Engineer and the Contractor at commencement of the work..

The machinery the Contractor intends to use for compaction (pneumatic, vibrating, static or other rollers) must be approved by the Engineer before employment.

The Contractor shall take care that each separate layer is formed with side slopes to ensure that water cannot gather on the surface, thus causing softening of the soil. Compaction shall start from the side of the embankment and continue towards the middle.

On completion of the embankment to formation level and stipulated side slopes, the layer of topsoil mentioned in Clause 4.9 shall be applied.

Earth fill is measured after compaction.

3.9 Grass Planting and Top Soil

Top soil shall be selected vegetable soil, well compacted and except where otherwise specified of 150 mm thickness.

The Contractor shall trim the faces of the side slopes to open channels and elsewhere where directed to the dimensions, inclinations and curves shown on the Drawings, remove all excess material and make good all depressions with suitable material.

Where instructed by the Engineer, the Contractor shall plant Kikuyu or other approved grass at the rate of 16 plants per m corresponding to 250mm c/c. The Engineer shall satisfy himself that natural growth of grass will not take place within a reasonable time before instructing the Contractor to grass specified areas.

The Contractor shall be responsible for obtaining suitable grass plants and for making all necessary arrangements with the owners and/or occupiers of the land from which they are to be obtained. The Contractor shall be responsible for the preparation of the embankment for the planting, and for maintaining adequate grass cover and necessary watering during the Contract and maintenance period.

Topsoiling and grassing are measured in square metres.

3.10 Ant-Proofing

Where an ant-proof course has been specified, it should be made by application of Rentokil termite soil concentrate or equal dilute one part concentrate to forty parts water (by weight) at the rate of 5 litres solution to 1 sq. metre to the whole area of the building immediately before (36 hours maximum) the concrete is poured. Additionally to all critical areas, i.e both sides of wall foundations, piers and porches the application should be 5 litres per running metre. Treatment should not be made when the soil is excessively wet. Precautions should be taken to prevent disturbance of the treated areas before they are covered.

Ant-proofing is measured in square metres

4. CONCRETE WORKS

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

4.2 Materials and Tests.

4.2.1 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.

4.2.2. 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, earthy 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.

4.2.3 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.

4.2.4 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.

4.2.5 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 | Maximum Water/Cement Ratio |
|----------------|----------------------------------|------------------------|----------------------------|
| 10 | 40 mm | 210 kg/m ³ | 0.5 |
| 15 | 40 mm | 250 kg/m ³ | 0.5 |
| 20 | 20 mm | 350 kg/m ³ | 0.5 |
| 25 | 14 mm | 390 kg/m ³ | 0.5 |

4.2.6 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 | Minimum average of 9 cubes |
|----------------|----------------------------|----------------------------|
| | At 7 days | at 28 days |
| 20 | 21 N/mm ² | 31.5N/mm ² |
| 25 | 24.5N/mm ² | 36.5 N/mm ² |

For the trial mixes the mix proportions shall be specified under clause 6.3 of BS 8110.

4.2.7. 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.

4.28 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 3.16, 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.

4.2.9 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 60mm |
| 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.

4.2.10 Steel Reinforcement

Steel for reinforced concrete shall be store under cover clear of ground and shall comply with BS 4449, BS 4461 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.

4.3 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 them 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.

4.4 Workmanship

4.4.1. 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.

4.4.2 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 and 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.

4.4.3 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.

4.4.4 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.

4.4.5 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.

4.4.6 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

4.4.7 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 bendings. 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.

4.4.8 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.

4.4.9 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.

4.4.10 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.

4.4.11 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 | 50 mm |
| Position of columns and Walls | 5 mm |
| Thickness of walls | 5 mm |
| Lateral dimensions of columns | 5 mm |
| Level of slabs, beams | 5 mm |
| Slab thickness | 5 mm |
| Lateral dimension of beams | 5 mm |
| Plumb of columns and walls | 3 mm in each storey(non/accumulative) |
| Window and door opening sizes | 5 mm |

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.

4.4.12 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.

4.4.13 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 approved. Mould oils and similar coatings shall be kept free from contact with the reinforcement.

4.4.14 Holes for Pipes, Cast-in Items etc., General

The Contractor shall be responsible for the co-ordination with the Sub-Contractors 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.

4.4.15 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 any way be in contact with the steel reinforcement.

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.

4.4.16 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 Columns | and | (unloaded) | 2 days |
|------------------|-----|------------|--------|

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.

4.4.17 Reinforcement

All bending, cutting and fixing to comply with BS 8110 and BS 4466. 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 4466 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 places, before any concreting is commenced.

5 BUILDERS WORK.

5.1 Concrete Block Walling.

5.1.1 Precast Concrete Blocks.

Concrete block shall comply with BS 6073. The blocks shall be solid or hollow, as specified on drawings, with a minimum compressive strength of 3.5 N/mm², tested as described in BS 6073.

All blocks must be left with good sharp edges. The standard face size of blocks for use in the works shall be 440 mm x 190 mm x 190 mm and this size of blocks shall be used wherever practicable.

No work with concrete blocks shall commence prior to a test report being presented to and accepted by the Engineer.

The contractor shall be responsible for making test blocks and experimenting with available materials to ascertain what mix will be necessary to attain the required strengths. If suitable materials are not available locally, the Contractor shall obtain them from other approved sources.

Manufacture shall be carried out under shelter and after casting, the blocks shall be stacked under shelter to protect them from sun and weather, and properly cured by covering with sand or sacks and sprayed daily for not less than 14 days.

5.1.2 Wall Reinforcement.

Reinforcement in walls made of solid blocks shall, where so specified, consist of a 25mm wide strip of "Exmet" or similar brick reinforcement centrally in joints at approximately 450mm centres (vertically) for the full length of the walls, lapped and crimped 300 mm at running joints and full width of walls at angles and intersections.

5.1.3 Cement.

The cement shall be as described in "Concrete Work".

5.1.4 Sand.

The sand for mortars shall be as described in "Concrete work", except that it shall be fine sand.

5.1.5 Mortar.

The cement mortar shall consist of one part of Portland cement to three parts of sand by volume.

The ingredients of mortar shall be measured in proper gauge boxes on a boarded platform, the ingredients being thoroughly mixed dry, and again whilst adding water. In the case of cement/lime mortar the sand and lime shall be mixed first, and then the cement added. All mortar is to be thoroughly mixed to a uniform consistency with only sufficient water to obtain a plastic condition suitable for trowelling. No mortar, that has commenced to seep, is to be used or remixed for use.

5.1.6 Damp-proof course.

All damp-proof courses shall be of bituminous felt to BS 743 weighing not less than 3 Kg per m², free from tears and holes, lapped 150mm at running joints and for full width of wall at angles and intersections and bedded on an including a 12mm levelled screed of cement mortar.

5.1.7 Workmanship.

Blocks shall be laid in regular even courses and shall be bedded in cement mortar consisting of one part of cement to three parts of sand. Before being laid all blocks shall be immersed in water for at least 12 hours. All beds and vertical joints shall be filled completely with mortar when the blocks are laid, and no flushing up will be permitted. No vertical joint in any one course shall be within 100mm of a similar joint in adjacent courses. Beds and joints shall be not less than 10 mm or more than 15mm thick. (Blockwork Tanks accepted).

The courses shall be laid parallel and all perpendiculars shall be truly kept. Reveals and internal and external angles shall be perfectly square and true.

All walls throughout the work shall be carried up evenly, no part being carried up more than 1 m higher than any other part.

The Contractor shall provide proper setting out rods and set out on the same all work showing openings, heights, sills and lintels and shall build the various walls and piers to the thicknesses, widths and heights shown upon the drawings.

All exposed faces of walls for plastering are to be left rough and the joints raked out while mortar is green to form adequate key.

All other faces shall be cleaned down on completion with a wire brush or as necessary and mortar droppings, smear marks, etc., removed and rates must include for this.

Where block work faces are to be left exposed blocks shall be chosen for their uniformity unmarked faces and shall be finished with a fair face and pointed with a neat joint recessed from the face of the blocks.

Where shown on the Drawings, walls are to be carried up to the underside of the roof sheets and are to be cut on top edge to suit roof slope and flushed up in cement mortar.

All putlog holes shall 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.

In the case of walls receiving plaster, or other in situ facings, put log holes must be filled before any facing is applied and prices must include for additional cost of free-standing scaffolding.

Tolerances as for concrete works.

5.1.8 Blockwork Tanks.

The concrete blocks shall be solid, type A with a minimum compressive strength of 7 N/mm², tested as described in BS 2028.

For circular blockwork tanks the blocks shall be manufactured in the required shape to fit the curvature of the tank, and all blocks shall be immersed in water for 24 hours before being laid.

Care must be taken to ensure that all joints are filled up completely. The horizontal joints to be reinforced as shown on the Drawings, with the reinforcement covered on all sides at least 6 mm of mortar, thus giving a thickness of horizontal joints of approximately 20mm.

No parts of the wall shall be carried up more than one course above any other part of the wall.

Reinforcement and holes for pipes passing through walls and floors shall meet the requirements as specified in Section 4.

Internal plaster shall be of mix 1:2, made water proof by use of approved additive.

5.2 Plasterwork and other Floor, Wall and Ceiling Finishes.

5.2.1 Cement.

The cement shall be as previously described in "Concrete works".

5.2.2 Sand.

The sand shall be as described for fine aggregate, but that for plastering shall be light in colour and well graded to a suitable fineness in accordance with the nature of the work in order to obtain the finish directed.

5.2.3 Lime.

The lime for plastering shall comply with BS 890 Clause "A" for non-hydraulic lime and shall be as rich as obtainable and to approval. It must be freshly burnt and shall be slaked at least one month before being used by drenching with water, well broken up and mixed and the wet mixture shall be passed through a sieve of 3 mm meshes. Lime putty shall consist of freshly slaked lime as described above, saturated with water until semi -fluid and passed through a fine sieve; it shall be allowed to stand until surplus water has evaporated and it has become of the consistency of thick paste, in no case for a shorter period than one month before being used, during which time it must be kept damp and clean and no portion of it allowed to become dry.

Alternatively, hydrated lime with 70% average calcium oxide content may be used and it must be protected from damp until required for use. It shall be soaked to a putty at least 24 hours before use.

5.2.4 Composition of plasters etc.

A mix referred as 1:4 shall mean 1 cubic metre of cement to 4 cubic metres of sand. All other mixes shall be construed in a like manner.

5.2.5 Hacking etc.

The prices for all screed, paving and plastering, etc. shall include for hacking concrete surfaces and for raking out joints of walls 15mm deep and for cross scoring undercoats to form a proper key. Plastering on walls shall be generally being taken to include faces of lintels, beams, etc. in same.

5.2.6 Surfaces.

All surfaces to be paved or plastered must be brushed clean and well wetted before each coat is applied. All cement pavings and plaster shall be kept continuously damp in the interval between application of coats and for seven days after the application of the final coat.

5.2.7 Partially or wholly set materials.

Partially or wholly set material will not be allowed to be used or remixed. The plaster mixes etc. must be used within one hour of being combined with water

5.2.8 Samples.

The Contractor shall prepare sample areas of the screed, pavings and plastering 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.

5.2.9 Finish generally.

All screed and pavings shall be finished smooth, even and truly level unless otherwise specified.

Rendering and plastering shall be finished plumb, square, smooth and even.

All surfaces to be plastered shall be thoroughly wetted before any plastering is commenced.

No plastering will be allowed to take place until all chases for services have been cut, services installed and chased made good.

On no account may finished plaster surface be chased and made good.

All work shall be to the approval of the Engineer and any work not complying with the above shall be hacked away and replaced at the Contractor's expense.

5.2.10 Arises and angles.

All arises and angles shall be clean and sharp or slightly rounded or thumb-coved as directed including neatly forming mitres.

5.2.11 Making good.

All making good shall be cut out to a rectangular shape, the edges undercut to form dovetail key and fished flush with the face of surrounding paving or plaster. All cracks, blisters and other defects shall be cut out and made good and the whole of the works shall be perfect on completion.

5.2.12 Prices to include.

In addition to the fore-going, prices are to include for all labour, angles and arises, all fair edges, for making good up to or stopping to a line and the required level at top of skirtings or angles where directed and for making good up to windows, door frames and similar.

The prices for all linear items unless otherwise measured are to include for all short lengths, lengths, angles and arises, mitres and ends of every description.

5.2.13 Cement pavings, screed etc.

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.

5.2.14 Cement rendering.

Cement rendering shall consist of cement and sand mix 1:4 to not less than 15mm finished thickness and be finished to a true and even surface.

5.2.15 Protection.

All work shall be adequately protected against damage, to the satisfaction of the Engineer until the works are handed over to the Engineer.

5.2 Carpentry and Joinery

5.3.1 Timber materials.

All timber shall be in accordance with the latest approved Grading rules issued by the Government of Kenya or other competent authority (Legal Notice No. 358). The quality shall be as First (or Prime) Grade.

All timber work to be carried out in accordance with BS 1186 and CP 112.

Any of the following timber may be used:

| <u>Standard Common Name</u> | <u>Botanical Name</u> |
|------------------------------------|------------------------------|
| Podocarpus | Podocarpus Spp |
| Cedar | Juniperus Procera |
| African mahogany (Munyama) | Khaya anthotheca |
| Mininga | Pterocarpus Angloensis |
| Mvule | Chrophora Excelsa |

All timber, as it arrives on the site, shall be inspected by the Engineer, and any timber brought on the site and not complying with the specification or not

approved, must be removed forthwith from the site, and only timber as approved shall be used in the works.

The Contractor shall upon signing the Contract, purchase sufficient supplies of specified hardwoods to avoid possible shortages at a later date.

All timber shall be free of live borer beetle or other insect attack when brought upon the Site. The Contractor shall be responsible up to the end of the maintenance period for executing at his own cost all work necessary to eradicate insect attack of timber which becomes evident-including the replacement of timber attacked or suspected of being attacked, notwithstanding that the timber concerned may have already been inspected and passed as fit for use.

All timber shall be seasoned to a moisture content of not more than 15%.

5.3.2 Boards and sheets.

Fibreboard shall be 12mm "Celotex" or other approved fibreboard complying with BS 1142, Part 3.

Plywood shall be laminated board faced on in both sides with 4mm plywood. Exposed edges shall be lipped with 20mm hardwood and rates shall include for leaping.

Plastic Sheeting shall be "Formica" sheeting, 1.5mm thick and securely fixed with approved type waterproof adhesive, and in the colours approved by the Engineer.

Flush doors shall be 445mm thick, and shall be obtained from an approved manufacturer. The doors shall comply with BS 459, Part 2. External doors shall be framed, ledged and braced as shown on the drawings, and they shall comply with BS 459, Part 4.

5.3.3 Workmanship.

All timber shall be as long as possible and practicable to eliminate joints. Where joints are unavoidable, surfaces shall be in contact over the whole area of the joint before fastenings are applied.

No nails, screws or bolts are to be fixed in any split end. If splitting is likely, or is encountered in the course of the work, holes for nails must be bent at right angles to the grain.

Lead holes are to be bored for all screws. When the use of bolts is specified, the holes are to be bored from both sides of the timber. Nuts must be brought up tight, but care is to be taken to avoid crushing of the timber under the washers.

All joiner's work shall be accurately set out on boards to full size for the information and guidance of the artisans before commencing the before commencing the respective works, with all joints, iron work and other works connected therewith fully delineated. Such setting out must be shown to the Engineer and approved before such respective works are commenced.

All joiner's work shall be cut out and framed together as soon after the commencement of the building as is practicable, but not to be wedged up or glued until the building is ready for fixing same. Any portions that warp, wind or develop shakes or other defects within twelve months after completion of the works shall be removed and new ones fixed in their place together with all other work which may be affected thereby, all at the Contractor's own expense.

All work shall be properly mortised, tenoned, housed, shouldered, dovetailed, notched, pinned, braided, etc., as directed and to the satisfaction of the Engineer and all properly glued up with the best quality glue.

Joints in joinery must be as specified or detailed, and so designed and secured as to resist or compensate for any stresses to which they may be subjected. All nails, springs, etc., are to be punched and puttied. Loose joints are to be made where provision must be made for shrinkage, glued joints where shrinkage need not be considered and where sealed joints are required. Glue for load bearing joints or where conditions may be damp must be of the resin type. For non-load bearing joints, or where dry conditions may be guaranteed, casein or Organic glues may be used.

All exposed surfaces of joinery work shall be wrought and all arises "eased of" by planing and sand papering to an approved finish suitable to the specified treatment.

Round wood plugs shall not be used. All work described as plugged shall be fixed with screws to plugs formed by drilling concrete, walls, etc., with a proper tool of suitable size and filling the holes completely with "Expandet" raw plastic or "Rawplugs" in accordance with the Manufacturer's instructions.

Where intended to be in contact with stone, concrete blocks, cement or plaster, the backs and other faces of all doors, windows and other frames and linings, posts, architectural skirtings, fillets and fascias shall be treated with two coats of wood preservative before fixing.

Bottom edges of doors shall be painted with one coat of approved primer before fixing.

Any fixed joinery which in the opinion of the Engineer is liable to become bruised or damaged in any way shall be completely cased and protected by the Contractor until the completion of the works.

5.3.4 Inspection and Testing.

The Engineer shall be given facilities for inspection of all works in progress whether in workshop or on site. The Contractor is to allow for testing of prototypes of special construction units and the Engineer shall be at liberty to select any samples he may require for the purpose of testing, i.e. for moisture content, identification, species, strength, etc. Such tests will be carried out by the Forestry Department.

5.3.5 Clearing Up.

The Contractor is to clear out and destroy or remove all cut ends, shavings and other wood waste from all parts of the building and the Site as the work progresses and at the conclusion of the work. This is to prevent accidental borer infestation and to discourage termites and decay.

5.3.6 Prices to Include.

Prices of items shall include for the foregoing labours, etc. and in addition the prices for linear items are to include all internal and external angles, either mitres or tongued all fair, fitted, stopped, notched or returned ends, all similar incidental labours and all short lengths.

The Contractors rates must also include for bedding frames, sills, etc., in mortar or dressing surfaces of walls etc.

5.4 Roofing.

The roof covering and fittings shall be as specified in the drawings or in the bill of quantities. The roofing material should be laid and fixed in strict accordance with the manufacturer's instructions.

Fixing to be of approved type and quality.

5.4.1 Protection.

All roof surfaces shall be kept clean and protected and handed over watertight at completion.

5.5 Steelwork.

5.5.1 Materials.

All materials shall be the best of their respective kinds and free from defects. The materials in all stages of transportation handling and stacking shall be kept clean and injury from breaking, bending and distortion prevented.

All steel and steel sections shall comply with BS 4, BS 4360 and BS 4848.

All steel shall be of approved manufacture and the Contractor shall on request deliver to the Engineer a manufacturer's test certificate for all steel used.

All structural steel shall be of grade 43A according to BS 4360.

Steel for handrails, screens etc. can be of a lower grade, but all steel shall be weldable and the grade shall be approved by the Engineer.

Electrodes shall be according to BS 639.

All electrodes shall be of a class appropriate to the steel. Bolts and nuts shall be according to BS 4190.

5.5.2 Workmanship.

Workmanship for all steelwork shall generally follow the requirements in BS 449 and BS 5135.

The contractor shall prepare all the necessary workshop drawings, which shall be approved by the Engineer. The Engineer's approval shall not in any way relieve the Contractor of his responsibility for the workshop drawings in accordance with the contract drawings and specifications

All welding of structural steel shall be carried out in the Contractors workshop and the whole structure or parts thereof shall be test assembled in the workshop before delivery to the site.

Should any doubt arise as to the quality of the steel or the welds, the Engineer may require testing carried out. If the results show insufficient quality of materials or workmanship, the Contractor shall cover all expenses related to the tests and shall replace all materials and welds found unsatisfactory.

5.5.3 Ladders.

All ladders in tanks etc shall be galvanized steel pipes in accordance with BS 1387 "medium class", and shall be made to the dimensions shown on the drawings.

5.6 Ironmongery and other Fittings.

All ironmongery shall be approved by the Engineer. The approved samples shall be regarded as the standard for work.

5.6.1 Locks.

All locks and ironmongery shall be with screws, etc. to match. Before the door etc. is painted, handles shall be removed, carefully stored and refixed after completion of painting. Locks shall be oiled and left in perfect working order.

25 mm diameter rubber door stops shall be provided at all doors and securely plugged and screwed to floors or walls.

All external doors shall be provided with locks of cylinder type. All internal doors to be provided with approved latch locks and handles. All locks shall have two keys with attached labels with door references before being handed over to the Engineer.

5.6.2 Sanitary Fittings.

All sanitary fittings shall be approved manufacture and installed in accordance with the manufacturer's recommendations.

5.7 Glazing.

5.7.1 Glass.

All glass shall comply with BS 952 and be free from flaws, bubbles, specks and other imperfections.

Glass panes shall be cut to sizes to fit the opening with not more than 2 mm play all round and where puttied shall be clipped to the frames.

Clear sheet glass shall be ordinary glazing quality.

5.7.2 Cleaning.

On completion, remove all broken, scratched or cracked panes and replace with new to the satisfaction of the Engineer. Clean inside and out with approved liquid cleaner. On no account shall windows be cleaned by scraping with glass.

5.8 Painting, Decorating and other Surface Treatment.

5.8.1 Approved Specialist.

All work under this trade must be executed by an approved specialist unless the Engineer agrees otherwise. Paint shall be of approved manufacture.

5.8.2 General.

The Contractor shall so arrange his programme of work that all other trades are completed and the workmen are away from the area to be painted, when painting begins. Before painting, the Contractor must remove all concrete and mortar dropping and the like from all work to be decorated and remove all stains as to obtain uniform colour to work to be oiled and polished.

All plaster, metal, wood and other surfaces which are to receive finishes of paint, stain, distemper or paint work of any description are to be carefully inspected by the Contractor before he allows any of his painters to commence work. The Contractor will be held solely responsible for all defective work condemned as a result of his painter's failure to insist on receiving from the other trades surfaces in the proper condition to allow first class finishes of the various kinds specified being applied to them.

5.8.3 Painting generally.

All materials to be applied externally shall be of exterior quality and/or recommended by the manufacturers for external use, all in accordance with BS 4800 or similar.

All materials shall be delivered on site intact in the original sealed drums of tins and shall be mixed and applied strictly in accordance with the manufacturer's instruction and to the approval of the Engineer.

Unless specially instructed or approved by the Engineer, no paints are to be thinned or otherwise adulterated, but are to be used as supplied by the manufacturers and direct from the tins.

The priming, undercoats and finishing coats shall each be of differing tints and the priming and undercoats shall be the correct brands and tints to suit the respective finishing coats in accordance with the manufacturer's instruction. All finishing coats shall be of colours and tints selected by the Engineer. Each coat must be approved by the Engineer before the next coat is applied.

All paints, emulsion paints and distempers shall be applied by means of a brush or spray gun or rollers of an approved type where so agreed by the Engineer.

No painting is to be done in wet weather or on surfaces which are not thoroughly dry.

Each coat shall be properly dry and in the case of oil or enamel paints shall be well rubbed down with fine glass paper before the next coat is applied. The paint work shall be finished smooth and free from brush marks.

The rates for painting shall include for preparation of surfaces, rubbing down between each coat, stopping, knotting, etc. and all other work in connection and as described and as necessary to obtain a first class and proper finish to the Engineer's approval.

5.8.4 Samples.

The Contractor shall furnish at the earliest possible opportunity before work commences and at his own cost, samples of painting for the Engineer's approval and any further samples in the case of rejection.

Such samples when approved, shall be the minimum standard for the work to which they apply. If required by the Engineer, the Contractor is to provide at his own expense samples of paints, etc., with containers and cases to be forwarded carriage paid by the Contractor for analysis at a laboratory.

Colour cards of all paints, etc. shall be submitted to the Engineer.

The Engineer may reject any materials or workmanship not in his opinion up to the approved sample, and these must be removed from the site without delay.

5.8.5 Preparation and Priming of Plaster etc. Surfaces.

Surfaces shall be perfectly smooth, free from defects and ready for decoration. All such surfaces shall be allowed to dry for a minimum period of six weeks, stopped with approved plaster compound stopping and rubbed down flush, as necessary, and then be thoroughly brushed down and left free from all efflorescence, dirt and dust immediately prior to decorating.

Plaster surfaces, which are to be finished with emulsion, oil or enamel paint, shall be primed with an alkali resisting primer complying with the particular paint Manufacturer's specification and applied in accordance with their instructions.

Fibreboard or similar surfaces shall be lightly brushed down to remove all dirt, dust and loose particles and have all nail holes or other defects stopped with an approved plaster compound stopping rubbed down flush and left with a texture to match surrounding material.

5.8.6 Preparation and Priming of Metalwork.

All surfaces shall be thoroughly brushed down with wire brushes and scraped where necessary to remove all scale, rust, etc. immediately prior to decorating. Where severe rust exists and if approved by the Engineer, a proprietary de-rusting solution may be used in accordance with the manufacturer's instructions.

Shop primed and unprimed surfaces shall be given one coat of metal chromate primer or lead oxide primer.

Galvanized surfaces shall be treated before priming with an approved proprietary mordant or de-greasing solution. The surfaces shall be thoroughly washed down with water, allowed to dry and primed as last.

Coated surfaces already treated with bituminous solution, shall be scraped to remove soft parts and then receive two isolating coats of aluminium primer or other approved anti-tar primer.

5.8.7 Preparation and Priming Woodwork.

All woodwork shall be rubbed down, all knots, covered with a thick coat of good shellac or aluminium knotting; primed with one coat of approved ready-mixed proprietary wood primer and all cracks, nail holes, defects and uneven surfaces, etc., stopped and faced up with hard stopping rubbed down flush.

5.8.8 Wood preservative.

All woodwork in contact with walling or plaster shall be treated after cutting and preparation but before assembly or fixing with one coat of approved wood preservative. The solution is to be brushed on all faces of all timbers, unless exposed to view and painted.

5.8.9 Cement Paint.

Shall be super snowcem or equal and approved. Two coats shall be applied after preparation as specified above.

5.8.10 Emulsion Paint.

After preparation as specified above a minimum of three coats shall be applied using a thinning medium or water only as recommended by the Manufacturer.

An approved plaster primer tinted to match may be substituted for the first coat.

5.8.11 Enamel Paint.

Apply two undercoats and one finishing coat, after preparation and priming as specified above.

5.8.12 Ironmongery.

Where instructed, all ironmongery shall be removed from joinery, steel windows and louvres before panting is commenced, and shall be cleaned and renovated if necessary and refixed after completion of painting.

5.8.13 Painting Items.

As billed here- after shall include for preparing and priming surfaces as above described.

5.8.14 Lining of Chemical Tanks.

The lining of chemical tanks with "EPOBOND" and "EPOFLOOR" shall be carried out by specialists approved for such work by the manufacturer or his agent.

The preparation of the surface to receive the above products must either be carried out by specialist or by the Contractor in which case the manufacturers or his agents written approval of the preparation of the surface shall be obtained prior to the application of the product.

5.8.14 Cover Up.

Cover all floors, fittings, etc. with dust sheets when executing all painting and decorating work.

5.8.15 Clean and Touch Up.

Paint splashes. Spots and stains shall be removed from, floors. Wood-work, etc., any damaged surfaces touched up and the whole of the work left clean and perfect upon completion and during the maintenance period.

6 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.

6.1 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.

6.2 Laying and Jointing of Pipes

All laying and jointing of pipes except jointing of PVC and polythene pipes shall be in conformity with BS 6700 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.

6.3 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 handwheels.

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.

6.4 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 1.6 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.

6.5 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 4164 or with cold applied material complying with BS 3416 type II material.

6.6 Grey Iron or Cast-Iron

Grey iron or cast iron pipes and fittings shall comply with BS 4622 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 1.6N/mm².

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

6.7 Steel

Steel pipes and fittings shall comply with BS 534, BS 1387 or BS 3601. Pipes complying with BS 1387 shall be of "Medium" or "Heavy" classes as specified in the Bills of Quantities and Drawings.

6.8 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 – 1.6 N/mm²

All fittings shall be of pressure class “PN 16” 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.

6.9 Precast Concrete

Precast concrete pipes and fittings shall comply with BS 556: 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.

6.10 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 haunching 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 haunching to be flush with the top of the pipe.
- (iii) Surrounding concrete shall comprise a concrete bed 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.

6.11 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 6700.

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

6.12 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.

Mainwork 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 airvalves 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.

6.13 Cleaning and Sterilisation 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 6700.

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.

6.14 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 white gloss paint.

7 ELECTRICAL-MECHANICAL WORKS

7.1 Motors

All motors shall unless otherwise stated be suitable for a 415/240 volt, 3 phase, 50 cycles, wire power supply, and shall be operated through star delta start control system.

The motors shall be constructed in accordance with CP 1015, and shall be protected as per the Government Electrical Specifications.

The motor speed shall be 1450 or 2900 RPM as specified. The motor shall be foot mounted squirrel cage, drip-proof, or totally enclosed suitable for an ambient temperature of 30°C. The motor shall be designed for continuous running. Each motor shall be capable of an overlaid of 10% above its rated output at the rated voltage for a period of one hour without sustaining damage.

The rate output of the motor shall be the maximum house power absorbed by the pump under the described condition of head and discharge, plus an allowance for loss of power in couplings etc.

Electrically drives pumps, shall, if not otherwise stated be directly coupled via flexible couplings to the motors. Motors and pumps shall be fitted to common rigid steel frames bolted to concrete plinths.

Proper alignment of motor and pump must be guaranteed.

7.2 Pumps

The pumps shall be of the centrifugal type with cast iron casings. The shaft shall be prepared for direct connection via flexible couplings to the electrical motors.

Pump casing shall have interchangeable bronze wear rings. The impellers shall be of bronze or high-grade cast iron dynamically balanced to ensure smooth running. The impeller shaft shall be of steel and fitted with renewable bronze protecting sleeves wherever it is in contact with the pumped water. Mechanical seals shall be provided unless approved otherwise. It shall be stated in the tender documents if other materials are offered.

For horizontal type pumps, the impeller shaft shall be carried by oil or grease lubricated ball roller bearings of heavy-duty type.

The pump casings, bearings, shaft, impellers and gaskets must be executed of materials suitable for many years continuous operation in a water system.

If materials other than cast iron, bronze or stainless steel are included in the

pump, it cannot be approved unless a written guarantee for 10 years performance is produced, giving free replacement including labour in case of fault.

All pipe connections shall be flanged, and prices shall include for the necessary tapers, gaskets, bolts etc. for connecting up to the pipe diameters and to the extent shown on the drawings or instructed by the Engineer.

The pump type and size shall be chosen so as to ensure that the pump is working with an efficiency of not less than 90% of the peak efficiency. Performance curves, efficiency curves and power demand curves shall accompany the Tender, with clear indication of the capacity and efficiency for the pump with the specified head.

The high lift pumps shall be horizontal multi-stage centrifugal pumps of approved manufacture. The capacity for each pump shall be approximately 101m³/hr at a total head of 30m and one pump standby in parallel at the same head.

Two pressure gauges in metric units are to be provided at each pump. The pressure gauges are to be connected to the delivery and suction sides of the pump by use of approved copper pipes fitted with an isolating cock.

SECTION VII: TENDER FORMS

• 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: _____

Tender-Securing Declaration

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)

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.

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 PPDA, 2015)

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.....

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: _____

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 VIII: FORMS OF SECURITY

- **Tender Security (Bank Guarantee)**

*[If required, the **Bank /Tenderer** shall fill in this Guarantee form in accordance with the instructions indicated in brackets.]*

[insert bank'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)]

Performance Bank Guarantee [Unconditional]

[The **Bank /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]

Bank Guarantee for Advance Payment

[Bank'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: _____

Address: _____

Date: _____

**SECTION IX: APPLICATION TO PUBLIC PROCUREMENT ADMINISTRATIVE
REVIEW BOARD**

FORM RB 1

**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 of
.....20.....

SIGNED

Board Secretary

SECTION X: EVALUATION CRITERIA

**TANA WATER WORKS DEVELOPMENT AGENCY
EVALUATION CRITERIA**

BIDDER NO.....

STAGE 1 – MANDATORY REQUIREMENTS

In this stage bidders are to be evaluated on YES or NO basis. Any bidder who does not meet any of the requirements in this stage does not proceed to stage 2. The evaluator must clearly indicate the reasons for disqualification (if any) at the bottom of the table

| | MANDATORY REQUIREMENTS | Yes | No | Remarks (Fail or Pass) at the bottom |
|-----|--|------------|-----------|---|
| | Submission of valid documents under listed:- | | | |
| 1. | Bidders must submit 2 hard copies; 1 original, 1 copy | | | |
| 2. | Valid Tax Compliance Certificate | | | |
| 3. | A copy of the Firm`s valid KRA PIN certificate | | | |
| 4. | List of Directors with respective shareholding & details of citizenship – Attach CR12 for the current year. | | | |
| 5. | Audited Accounts for the last three years (i.e. within the period of 2019 to 2021 which must be signed by the auditor and the directors) | | | |
| 6. | Evidence of annual volume of construction works in any of the last 3 years of Ksh.150 M and evidence of adequate working capital for this contract i.e. certified bank statements for the last 1 year or a letter of credit from a reputable financial institution | | | |
| 7. | Evidence/proof of having undertaken Four similar works in the last 3 years. | | | |
| 8. | Certificate of Company Registration Certificate under the Companies Act, Cap 486 and in existence for at least Five (5) years. | | | |
| 9. | A copy of current Registrations Certificate as a construction firm by The Ministry of Water and Sanitation and Irrigation for the current year category ‘D’ and a valid copy of National Construction Authority certificate category ‘6’ and above as a Water Works Contractor | | | |
| 10. | Bid Security as described in the ITT. It shall be valid for 120 days from the date of submission. | | | |
| 11. | Company profile and key staff resumes (Project Manager, Site Agent, Inspector of Works and Surveyor) | | | |
| 12. | Registered office, including physical address of the current office | | | |
| 13. | Proof of availability of major items required for construction works. (Concrete Mixer, HDPE Butt Fusion Machine (50-315 mm Ø, Poker Vibrator and Lorry, Excavator or backhoe and compressor Cp with 2 jacks) | | | |
| 14. | Form of Bid MUST be duly filled, stamped and signed by an authorized person and any Cancellations in the Form of Bid MUST be countersigned | | | |

| | | | | |
|-----|---|--|--|--|
| 15. | The BoQ MUST be duly filled, stamped and signed by an authorized person and any cancellations in BoQs MUST be Countersigned | | | |
| 16. | The Bidder MUST provide Power of Attorney to the person signing the tender | | | |
| 17. | Duly filled Original Pre-Bid Site Visit Certificate must be attached | | | |
| 18. | Bidders must systematically serialize every page of the bid documents submitted | | | |
| 19. | Bidders must stamp every page of their document with official rubber stamp for ownership | | | |
| 20. | Bidders MUST submit neatly hard bound documents. Any documents submitted as loose papers will be rejected at the preliminary evaluation stage and shall not progress to technical evaluation. | | | |
| 21. | Bidder must indicate his/her firm's ability to extend Credit Facility (must indicate a period of at least 30 days in form of a signed by an authorized officer and stamped commitment letter drawn on the candidate's letterhead) | | | |
| 22. | Litigation history: Indicate if there are any pending court cases on public procurement matters (evidenced by a written stamped affidavit by the commissioner of oaths) | | | |
| | REMARKS | | | |

Evaluator No.....

Reasons for disqualification (if any)

.....

STAGE 2(i)– OTHER REQUIREMENTS

BIDDER NO.....

In this stage bidders are to be evaluated on marks. Any bidder who does NOT achieve at least 75% in this stage does not proceed to stage 3

| | TECHNICAL EVALUATION REQUIREMENTS | Required Marks | Awarded Marks | Remarks |
|----------|--|--|----------------------|----------------|
| 1 | <p><u>Key Personnel Qualifications, Company’s past Experience/Operation performance, key Equipment and Programme of Works.</u></p> <p>(a) <u>Key Personnel Qualifications and experiences – 30 points</u></p> <p>List / provide at least four (4) key professional staff with specific portfolio/task each with the following minimum qualification and experience:</p> <p>a) Company/ Project Manager/ Director must have a minimum of Bachelor Degree or Higher National Diploma in Civil/Water Engineering or Construction Technology [attach copies of qualification - 3 points] – Minimum 5 years’ Experience (Attach copies/testimonials)-1 point for each year – (total 5 points)</p> <p>b) Engineer/site agent must have a minimum of a Degree in Civil /Water /Building Engineering or equivalent and registered with EBK or KETRB. [attach copies of qualification certificate – 4 points with at least four years’ experience in the construction industry {1 point each for years of experience} – (total 4 points) ;</p> <p>c) Inspector of works must have a minimum of a Diploma in Civil /Water /Building Engineering or equivalent [attach copies of qualification certificates 2 points with at least three years’ experience in the construction industry {1 point</p> | <p align="center">8</p> <p align="center">8</p> <p align="center">5</p> | | |

| | | | | |
|--|---|---------------------------------|--|--|
| | <p>each for years of experience} – (total 3 points) ;</p> <p>d) Surveyor must have a minimum of a Diploma in Survey or equivalent [attach copies of qualification certificates - 2 points with at least three years' experience in the construction industry {1 point each for years of experience} – (total 3 points);</p> <p>e) Certified CVs signed by both the employer and the employee {1point each} – (total 4 points)</p> | <p>5</p> <p>4</p> | | |
|--|---|---------------------------------|--|--|

| | | | | |
|----------|---|---|--|--|
| 2 | <p><u>Company's past Experience/Operation performance – (44 points) -</u></p> <p>➤ The company must have undertaken and successfully completed at least four similar works for at least three years that can best demonstrate past experience in undertaking similar projects. Provide details of client as below:</p> <p>a) Names {1point each},</p> <p>b) Addresses {1 point each}</p> <p>c) Contact persons {1 point each}</p> <p>d) Completion certificate each {4 point each or zero for less}</p> <p>e) Attaching any evidence like letters of engagement, Contract award etc from the said clients {4 points each or zero for none}</p> <p><u>KEY EQUIPMENT(16points)</u> Company's evidence of ownership/Lease Agreement of the 4 No. key construction equipment (4 marks for each)</p> <ul style="list-style-type: none"> • Butt fusion machine (50- 315mm dia) • Poker vibrator • Concrete mixer | <p>44</p> <p>4</p> <p>4</p> <p>4</p> <p>16</p> <p>16</p> <p>16</p> | | |
|----------|---|---|--|--|

| | | | | |
|--|--|-----------|------------|--|
| | <ul style="list-style-type: none"> Excavator/ backhoe loader <p><u>PROGRAMME OF WORKS(10 POINTS)</u> Submit a draft programme of works and schedule of payment/ cash flow estimate which shall form part of the contract if the bid is accepted.</p> | | | |
| | <u>TOTAL MARKS</u> | 10 | 100 | |

EVALUATOR NO.....

The evaluator should give comments on the entire evaluation of stage 2 which will form a basis of the committee’s decision:

.....

.....

.....

STAGE 2(ii) – FINANCIAL COMPARISONS

At this stage, bidders' financial quotations will be compared with each other. The award will be to the lowest evaluated bidder (who will be position one).

| | |
|----------------------------|---------------|
| Bidder's Name | |
| Financial Quotation | Ksh |
| Position | Out of |

Evaluation carried out by.....Sign.....

Confirmed by:

1.Sign.....
2.Sign.....
3.Sign.....
4.Sign.....
5.Sign.....

Date.....

SECTION XI: BILLS OF QUANTITIES

PREAMBLE TO THE BILLS OF QUANTITIES

GENERAL DIRECTIONS

1. The Conditions of Contract together with the Specification and the Drawings shall be read in conjunction with the Bill of Quantities and in so far as they have any bearing shall be referred to for details of the description, quality, test and strength of material used and the workmanship, conditions, obligations, liabilities and instructions generally which shall be complied with in carrying out this Contract. The cost of complying with all conditions, obligations and liabilities described in the Conditions of Contract and Specification and in the Bill of Quantities, including all overhead charges shall be deemed to be spread over and included in the prices or sums stated by the Contractor in the Bill of Quantities.

2. Each item shall be priced and extended to the "Amount" column by the Contractor with the exception of the items for which a rate only is required or which already have Provisional Sums affixed thereto. If the Contractor omits to price any items in the bill of quantities, then the cost of the work of such items shall be held to be spread over and included in the prices given in the other items of work. The Day work Schedule shall also be completed.

The Bill of Quantities has been divided into sections, where possible. Notwithstanding such division of the Works for convenience of pricing and re-measurement thereof, nothing contained therein shall in any way relieve nor be deemed to relieve the Contractor of his responsibility set forth elsewhere in the contract.

3. The quantities of work and material set forth in the Bill of Quantities are in estimate only and are not to be considered as limiting nor as extending the amount of work to be done and material to be supplied by the Contractor. The Works as completed in accordance with the Contract shall be measured and paid for as described in this Bill of Quantities and in accordance with the Conditions of Contract and Specification.

4. Progress payments in the Interim Certificate referred to in Clause 60 of the Conditions of Contract in respect of "sum" items in the Bill of Quantities shall be by means of interim progress instalments, such instalments not exceeding in aggregate the total of each sum item. Such interim progress instalments shall be assessed by the Engineer based on the extent that the work to be done or liabilities or charges to be incurred by the Contractor under the description of each item bears to the extent of such work, liabilities or charges actually carried out under each sum item from time to time.

Such progress payments in respect of sum items shall be subject to the terms of retention referred to in Clause 60 of the Conditions of Contract.

5. The units of measurement described in the Bill of Quantities are metric units. Abbreviations used in the Bill of Quantities are as follows:-

| | | |
|-----------------|---|--------------------------------|
| km | = | Kilometre |
| m | = | Metre |
| mm | = | Millimetre |
| m ² | = | Square Metre |
| m ³ | = | Cubic Metre |
| mm ² | = | Square Millimetre |
| nr. | = | Number |
| kg | = | Kilogramme |
| Mg | = | Megagramme (metric tonne) |
| litre | = | Litre |
| ml | = | Millilitre (cubic centimetres) |

All rates and sums of money quoted in the Bill of Quantities shall be in Kenya Shillings and Cents.

The Contractor is referred to the Additional General Instructions Clause 1 to 17 inclusive hereafter regarding measurement and pricing of the various items in the Bill of Quantities, and these instructions shall be read in conjunction with the Specification, Conditions of Contract and Drawings as stated in 1 above.

6. The following abbreviations are used in the description of items in the Bills of Quantities: -

| | | |
|------|---|-----------------------------------|
| A.C. | = | Asbestos Cement |
| C.I. | = | Cast Iron (Grey Iron) |
| D.I. | = | Ductile Iron |
| E.O. | = | Extra Over |
| m.h. | = | Manhole |
| n.e. | = | Not exceeding |
| r.c. | = | Reinforced concrete |
| p.c. | = | Precast Concrete |
| uPVC | = | unplasticized Poly Vinyl Chloride |

PARTICULAR INSTRUCTIONS FOR MEASUREMENTS AND PRICING OF ITEMS IN THE BILL OF QUANTITIES

• 1. Dealing with Water

No measurement will be taken for the construction, maintenance and removal of temporary diversion works or other works including pumping required for dealing with water during the execution of the Works except where specifically required and items appear in the Bill of Quantities.

2. Site Clearance and Demolition

The units of measurement shall be:

| | | |
|-------|---------------------------------------|---------------|
| (i) | General Site Clearance | square metres |
| (ii) | General Site clearance for pipelines | metre |
| (iii) | Removal of trees and stumps | number |
| (iv) | Demolition of building and structures | sum |
| (v) | Demolition of pipelines | metre |

Girths of trees shall be measured 600 mm above ground level.

There will be no measurement of the stumps of trees which are themselves to be removed.

General Site clearance shall include the removal of trees with a girth less than 500 mm and stumps of diameter less than 150mm.

3. Excavation and Earthworks

(a) The units of measurements shall be:

| | | |
|-------|--|---------------|
| (i) | Bulk excavation and filling | cubic metre |
| (ii) | Excavation, filling and compaction for pipelines | metre |
| (iii) | Excavation in rock, extra over (i) and (ii) above | cubic metre |
| (iv) | Preparation of surface, trimming of slopes, pitching, soiling and grassing | square metres |

(b) Method of Measurement

(i) Earthworks measured by the cubic metre. The measured volume shall be the net-in-situ volume obtained from the difference between the lines, levels and profiles of the ground or rock surface agreed with the Engineer before excavation is commenced and the lines, levels and profiles as shown on the Drawings, or as may be ordered by the Engineer as necessary for the Works. Where the Drawings do not indicate the profiles of the excavation, the measured volume shall be the volume of the voids that would be formed if the completed structure, for which the excavation is performed, were to be lifted vertically out of the ground.

(ii) Pipelines measured by the cubic metre.

Where excavation for pipe runs is measured in the Bill of Quantities by the cubic metre then the measurement shall be taken as the vertical depth from the commencing surface down to

formation level and the width of the excavation as 400 mm wider than the nominal internal diameter of the pipe or as directed by the Engineer.

- (iii) Pipelines measured by the metre
Depths used for classification in the Bill of Quantities shall be measured from the commencing surface to the inverts of the pipes.
- (iv) No measurement will be taken for material excavated beyond the limits and levels specified above.

(c) Item Coverage

No separate payment will be made beyond the rates for excavation for:-

- (i) All necessary Temporary Works including dealing with water in the excavation;
- (ii) Any over breakage and any additional working space required and refilling of same;
- (iii) Making good all slips or falls of materials;
- (iv) Trimming of excavation to correct lines levels and profiles;
- (v) Preparation of foundations as specified except where specifically provided for in separate Bill items;
- (vi) Reinstatement of ground along pipelines to its former nature except where specifically provided for in separate Bill items
- (vii) Location, uplifting, transportation, handling and sorting of approved selected material from the excavations for use in the backfilling of trench and other excavations;
- (viii) Backfilling and disposal of materials and removal of surplus to spoil dump all as specified.

(d) Filling:

Normal material from store forming embankments around structures shall be measured by the cubic metre as the net compacted volume of filling comprised within the sections shown on the Drawings to the approval of the Engineer. No extra payment will be made for additional material placed to allow for the effect of settlement.

4. Concrete and Reinforced Concrete

(a) The units of measurement shall be:

- (i) In-situ concrete other than blinding and granolithic concrete cubic metre
- (ii) Blinding concrete and granolithic concrete with the thickness stated square metre

(b) Method of measurement:

All cast-in-situ concrete will be the quantity calculated from the dimensions shown on the Drawings or as approved by the Engineer. No deductions in the measurement will be made for:

- (i) Mortar beds;
- (ii) chamfers, ducts, chases, fillets, splays, drips, rebates, recesses, grooves and the like, not exceeding 0.005 square metres in cross sectional area;
- (iii) Bolt holes, pockets, sockets, mortices and the like formed in the concrete not exceeding 0.1 cubic metres in volume.

- (iv) Cast in components each less than 0.1 cubic metres in volume;
- (v) Reinforcement and other metal sections.

(c) Item coverage:

No separate payment will be made beyond the rates for concrete for: -

- (i) Trial mixes (for Specification Classes of concrete only);
- (ii) Supply of cement, water and processed aggregates;
- (iii) Supply and placing of mortar beds or rendering as specified;
- (iv) Mixing, transporting, placing, compacting, surface tamping to provide UI finish, protecting and curing the concrete;
- (v) hacking, cleaning and roughening by wet sand blasting, scrubbling or other means concrete surfaces on or against which further concrete is to be placed;
- (vi) Rubbing down faces;
- (vii) shuttering and waterstops to construction joints, not expressly required by the Engineer, Keys and the like.
- (viii) Providing samples and testing of materials and concrete;
- (ix) Provision and use of admixtures;
- (x) Placing and compacting concrete around steel reinforcement and other cast in components;
- (xi) Placing and compacting concrete at varying heights;
- (xii) Creating falls, cambers and shaped profiles;
- (xiii) Formwork to edge of concrete in blinding layers;
- (xiv) All additional concrete to fill overbreak and/or working space;
- (xv) Where concretes of different cement contents are required to be placed simultaneously in the same life of concrete;
- (xvi) Placing and compacting concrete to inclined or battered faces including any necessary upper surfaces formwork inclined at an angle of less than 15E to the horizontal.

5. Precast Concrete

(a) The units of measurement shall be:

- (i) Beams, slabs, segmental units: number
- (ii) Copings, sills and the like of uniform cross-section: metre

(b) The term "precast concrete" applies to any concrete unit or member cast on site but not in its final position and to concrete units or members manufactured off site.

(c) Item coverage:

No separate payment will be made beyond the rates for precast concrete for:

- (i) trial mixes;
- (ii) reinforcement, cement and processed aggregates;

- (iii) formwork, surface finishing, lifting devices and bearing plates;
- (iv) forming sockets, holes, grooves, rebates recesses and ducts; and except where otherwise indicated,
- (v) handling, laying and fixing the units in position;
- (vi) aligning members and units, adjusting levels and soffit profiles, and temporary fixing to prevent displacement;
- (vii) cutting and trimming copings, sills and the like to size.

6. Steel Reinforcement

(a) The Units of measurement shall be:

- | | | |
|-------|--|-----------------|
| (i) | Steel rod reinforcement | kilogramme (kg) |
| (ii) | Steel fabric reinforcement | square metres |
| (iii) | Steel dowels of stated diameter and length | number |

(b) Method of measurement:

The weight of steel rod reinforcement shall be calculated on the basis that steel weighs 7,850 kgs per cubic metre. The steel rod reinforcement shall be measured as the net theoretical calculated weight of the steel actually used in the work (including laps as specified) in accordance with the bending schedules prepared by the Engineer with no allowance being made in the measurement thereof for rolling margin or otherwise. Tying wire shall not be measured.

Fabric reinforcement shall be measured as the area of work covered, the weight per square metre being stated.

(c) Item coverage:

No separate payment will be made beyond the rates for steel reinforcement for:

- (i) Supplying, cutting to length, cleaning, bending, hooking, waste incurred by cutting, handling;
- (ii) Placing and fixing in the required position, including binding wire or other approved material;
- (iii) Placing supports and spacers;
- (iv) Extra fabric reinforcement in laps;
- (v) In the case of dowels - drilling holes or forming pockets in the structure and casting dowels into their final position.

7. Formwork

(a) The units of measurement shall be:

- | | | |
|-----|------------------|--------------|
| (i) | General formwork | square metre |
|-----|------------------|--------------|

- (ii) Formwork less than 300mm wide metre
- (iii) Boxouts, pockets, etc. of stated size number
- (iv) Rebates, chases, etc. of staged size metre

(b) Method of measurement

Subject to the limitations stated below general formwork will be measured as the superficial area of formwork actually in contact with the finished face of the concrete but no deduction shall be made for openings in formwork of 0.4 square metres or less.

Formwork shall not be measured:

- (i) for forming construction joints (whether shown or not on the Drawings), skewbacks, stunt ends, steppings, bonding chases, keys and the like;
- (ii) for forming boxouts, pockets, etc., of stated size that are measured by number;
- (iii) for forming rebates, chases, etc., of stated size that are measured by the metre;
- (iv) to edge of concrete in blinding layers;
- (v) to upper surfaces of concrete inclined at angle of less than 15EC to the horizontal.

(c) Classification of formwork;

Plane formwork shall be classified according to its angle of inclination as follows:-

| Class | Angle of inclination to the vertical |
|------------|--------------------------------------|
| Horizontal | 5E- 90E |
| Sloping | 10E- 85E |
| Battered | 0E- 10E |
| Vertical | 0E |

(d) Item coverage:

No separate payment will be made beyond the rates for formwork for:

- (i) falsework, centering, fabricating, assembling, cutting, fitting and fixing in position and taking all measurement necessary to produce the required profiles;
- (ii) forming cambers or falls;
- (iii) linings and taking all measures necessary to produce the required finish to the surfaces of the concrete;
- (iv) cutting and fitting around projecting members, pipes reinforcement and the like;

- (v) forming fillets, chamfers, splays, drips, rebates, recesses, grooves and the like not exceeding 0.0025 square metre in cross-sectional area, unless itemised in the Bill of Quantities.
- (vi) maintaining in place until it is struck and allowing for any variation from the minimum period for striking arising from prevailing weather conditions.
- (vii) striking, taking down and removing;
- (viii) any additional concrete provided in lieu of formwork to fill overbreak or working space.

8. Building in Plant, Equipment and Pipework

Items appear in the Bill of Quantities for building-in plant equipment and pipework. The rates in the Bill of Quantities shall include for all materials, formwork, etc. required for such building-in. No additional payment will be made should the Contractor choose to form boxouts, pockets, etc., and grout in at a later date.

9. Unshuttered Surfaces

The unit of measurement shall be square metre

Unshuttered surfaces are described in the Specification. Items are provided where appropriate for surface finish type U2, U3 and U4 and the rates entered under these items shall include for all material, plant and labour required to finish the unshuttered concrete as specified.

No measurement shall be made for the normal screeded finish type U1.

10. Breaking out Reinforced Concrete and Blockwork

(a) The units of measurement shall be:

- (i) Breaking out, section thickness stated or shown on the Drawings -cubic metres
- (ii) Making good perimeter of permanent openings, section thickness stated or shown on the Drawings square metre
- (iii) Building in pipe work, etc of stated size number

(b) Method of measurement:

- (i) Breaking out. The section thicknesses stated or shown on the Drawings are nominal thicknesses only. For measurement the thicknesses of the sections shall be as measured on Site.
- (ii) Making good. For measurement purposes the perimeter shall be that existing after any making good of permanent openings. The perimeters and section thicknesses shall be as measured on site. The rates in the Bill of Quantities shall include for all materials, formwork, etc. and for filling of overbreak.

(c) Item coverage:

No separate payment will be made beyond the rates for breaking out for:

- (i) All equipment necessary;

- (ii) Any temporary supports, staging and the like;
- (iii) Any overbreak;
- (iv) Material for building in pipes and supporting the pipe;
- (v) Formwork;
- (vi) Removal of broken out materials off site;
- (vii) Cutting through reinforcement.

11. Pipes and Pipe work

(a) The units of measurement shall be:

- (i) Pipelines : metre
- (ii) Pipework, fittings and valves : number

(b) Method of measurement:

- (i) Lengths of pipelines shall be measured net as laid along their centre lines.
- (ii) Short lengths of pipes, the dimensions of which are detailed in the Bill of Quantities, shall be measured by number.
- (iii) Lengths of drainage pipes built into manholes and other chambers shall be measured from the inside faces of chambers.

(c) Item coverage:

No separate payment will be made beyond the rates for pipes and pipework for:-

- (i) Cost of supplying all pipes, jointing materials and short lengths to suit fittings;
- (ii) All necessary cutting and waste;
- (iii) All plant, labour and materials required for handling, distribution, laying and jointing in position;
- (iv) Testing of the pipe system.

12. Pipework Ancillaries

(a) The units of measurement shall be:

- (i) Beds, haunches and surrounds: metre
- (ii) Concrete stools and thrust and anchor blocks: cubic metre

(b) Method of measurement:

- (i) Separate measurement shall not be made for beds to haunched or surrounded pipes where the same material is used for beds and haunches or beds and surrounds respectively.

(c) Item coverage:

No separate payment will be made beyond the rates for thrust blocks, surrounds and the like for:

- (i) Excavation including working space;
- (ii) Formwork type F1 finish;
- (iii) Providing unshuttered surfaces to type U1.

13. Structural and Miscellaneous Metal Work

(a) The units of measurement shall be:

- (i) Structural and miscellaneous metal work including stairways, landings, walkways and platforms . Megagramme (Metric tonne)
- (ii) Ladders, handrails and the like metre
- (iii) Flooring, duct covers and the like square metre
- (iv) Tanks number

(b) Method of measurement:

The weight of mild steel to B.S 4360 grades 43A1 and 43A shall be taken for measurement as 7,850 kg/cu. m.

The measurement of metal work in (a) (i), including bolts, washers, and all other fixing shall be the net theoretical calculated weights of metalwork used in the work in accordance with the Drawings or as ordered by the Engineer. No allowance shall be made in the measurement thereof for rolling margin and other permissible deviations from standard weights.

(c) Item coverage:

No separate payment will be made beyond the rates for metal work for:

- (i) Cost of supplying materials;
- (ii) moulding, fabricating, welding, drilling, machining, screwing, galvanizing or painting as may be specified.
- (iii) Handling, transporting, hoisting, fitting and fixing in position complete;
- (iv) supply of all fixings;
- (v) Painting after erection as specified;

14. Brickwork, Blockwork and Masonry

(a) The units of measurements shall be:

- (i) Brickwork, blockwork and masonry not exceeding 1 metre in thickness square metres
- (ii) Brickwork, blockwork and masonry exceeding 1 metre in thickness cubic metres

- (iii) Damp proof courses, wall thickness stated metre
- (b) Method of measurement:
 - (i) Volumes and areas measured for brickwork, blockwork and masonry shall include the volumes and areas of joints.
 - (ii) No deduction or addition to the volumes and areas measured shall be made for rebates, projecting courses or other surface features each less than 0.05 square metre in cross sectional area.
 - (iii) No deduction from the Volumes and areas measured shall be made for holes and openings in walls or surfaces each less than 0.25 square metre in cross-sectional area.
 - (iv) Areas shall be measured at the centre lines of brickwork, blockwork and masonry.

- (c) Item coverage:

No separate payment will be made beyond the rates for the rates for brickwork, blockwork and masonry for:

- (i) Jointing, pointing and fair-faced work, in any type of bond including all rough and fair cutting;
- (ii) Plinths, corbels, bull noses, chases, rebates, quoins, brick copings string courses and the like;
- (iii) Centering and all temporary supports;
- (iv) Bonding into existing work;
- (v) Protection of work;
- (vi) Building in pipes, holdfasts, bolts and the like and forming openings less than 0.25 square metre in cross section;
- (vii) Ties and reinforcement.

15. Roofing

- (a) The units of measurement shall be:
 - (i) Galvanized corrugated sheet iron or proprietary sheet metal roofing SM
 - (ii) Translucent panels, extra over (i) above square metre
- (b) Method of measurement:
 - (i) Roofing shall be measured net as the overall area of finished roofing.
- (c) Item coverage:

No separate payment will be made beyond the rates for roofing for:

- (i) Cutting to length, waste and laps;
- (ii) Fixings, flashing, ridges and closure pieces.

16. Doors and Windows

- (a) The unit of measurement shall be number.
- (b) The rate in the Bill of Quantities shall include for the supply and building-in of all frames, glazing and all iron mongery as specified.

17. Refurbishment of Valves

Valves shall be refurbished as follows:-

- (a) Cut off water by closing up stream valve.
- (b) Remove bolts attaching bonnet (top half) to body (bottom half).
- (c) Withdraw bonnet including stem (spindle) and wedge (gate), leaving body only in pipeline.
- (d) Place steel blanking plate and gasket and bolt in position.
- (e) Turn on water.

The time for the above shall be kept to an absolute minimum by loosening bolts etc. early and shall not exceed one hour.

Valve interiors shall be fully stripped inspected and cleaned (wire brushed) in a workshop and reassembled, greased with new gland packing and new external bolts and gaskets. Any worn out parts e.g. spindles shall be replaced as instructed.

When valves have been refurbished, the water shall be turned off, the blanking plate removed, the interior of the body cleaned by wire brushing and the valve reassembled. The time for the above shall be kept to an absolute minimum and shall not exceed one hour.

The rate in the BoQ for refurbishment shall include for all labour, plant and tools to turn off and on the water supply for the removal, stripping, inspection, cleaning and reassembly of the valve both on site and in the workshop, for the supply of the temporary blanking plate, gasket and bolts, and for the supply of new gland packing, new gaskets and bolts and all oils and greases.

The Contractor shall be paid extra for the material costs only of any additional parts he is instructed to renew e.g. spindles and wedges.

18. Measurement and Payment for Gabions

- (a) Chain Link Fencing, Weld mesh etc.:

The unit of measurement for chain link fencing weld mesh etc for the manufacture of gabions will be per square metre, calculated from the area required to construct the boxes as shown on the drawings or directed by the Engineer without allowing for waste.

The rate shall include for supplying, transporting to any point on the site, cutting, waste, bending, welding or binding, placing in position and binding, and all labour, tools plant, supervision, overheads and profit.

(b) Rock Fill to Gabions:

The unit measurement shall be per cubic metre of rock fill calculated from the volume of the boxes shown on the drawing or directed by the Engineer. The rate shall include for providing and selecting rock or boulders, transporting to any point on site, hand packing inside boxes trimming and compaction of surface to receive boxes, and all labour, plant, supervision, overheads and profit.

(c) Any excavation and backfilling required to place gabions in cut will be paid for as "Excavation for Structure". No additional payment will be made for filling behind gabions placed in front of embankments or fills and any additional work shall be included in the rate for earthworks.

BILL No. 1

PRELIMINARIES AND GENERAL ITEMS

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE (Kshs) | AMOUNT (Kshs) |
|-----------------|---|-------------|-----------------|--------------------|----------------------|
| 1 | <u>CONTRACTUAL REQUIREMENTS</u> | | | | |
| 1.1 | Allow for provision of Performance Security in accordance with the General conditions | Item | L.S | | |
| 1.2 | Allow for provision of Insurance of Works and Contractor's Equipment, provision of Insurance against Accident to Workmen and provision of Third Party Insurance (including Employer's Property) all in accordance with the General Conditions of Contract. | Item | L.S | | |
| 2 | <u>SPECIAL REQUIREMENTS</u> | | | | |
| 2.1 | Contractor's Camp and Storage Yard: Allow for erection of the Contractor's Camp(s), Offices, Storage Yard and other facilities including mobilization, demobilization and movement of the works site on Completion. Include for all equipment, temporary measures, machines, tools, materials, facilities for workers, water and electricity supply etc. all as specified for execution of the Works, for the entire Contract Period. | Item | L.S | | |

| | | | | | |
|---|--|------|-----|--|--|
| 2.2 | Test Running of the Scheme: Allow for Test Running all the Project Components upon completion, for a period of 12 weeks upon completion and official commissioning of the Works. Test Running to be carried out in close liaison with the Water Services Provider's Staff The Contractor to allow for 'on job' training of Operation and Maintenance Staff, Tools, Chemicals, etc, and ensure that the operations are carried out full time on a 24 hour basis. all in accordance with General and specific conditions | Item | L.S | | |
| 2.3 | Allow for provision of Operation and Maintenance (O&M) Manuals in accordance with General and Specific Specifications of Bid Document | Item | L.S | | |
| 2.4 | Allow for provision of As-Built Drawings in accordance with General and Specific Specifications of Bid Document | Item | L.S | | |
| PAGE TOTAL CARRIED FORWARD TO COLLECTION | | | | | |
| 3 | <u>SPECIFIED REQUIREMENTS</u> | | | | |
| | <u>Sign Boards</u> | | | | |
| 3.1 | Allow for provision, erection and maintenance of Project Sign Boards at the sites indicated by the Engineer's Representative, within the Project Area and in accordance with the Conditions of Contract. The rate quoted by the Contractor to include for payment of all statutory charges to the relevant Authority and removal after completion of the Project. | Nr | 1 | | |

| | | | | | |
|----------|---|------|------|---------|--|
| 3.2 | Allow a P.C Sum of Ksh 50,000 for supply and installation of project plaque. Contractor to include for all requisite works associated with installation. | P.C | ITEM | 50,000 | |
| | | | | | |
| 3.3 | Add...% for profit, administration, attendance upon, overheads etc. for item 3.2 above. | % | | | |
| | | | | | |
| 4 | Material Testing | | | | |
| 4.1 | Allow a P.C. sum of Ksh. 250,000 to be used for material testing, concrete testing, ground investigations, soil testing and other test as may be directed by the Engineer. | P.C | ITEM | 250,000 | |
| | | | | | |
| 5 | <u>Setting Out & Survey Work</u> | | | | |
| | | | | | |
| 5.1 | Allow a Provisional Sum of Kshs. 100,000 for establishment of Level Survey Datum, Setting Out of the Works in accordance to the general conditions and any confirmatory survey works as required by the Engineer. | Item | P.C | 100,000 | |
| | | | | | |
| | The Setting Out / Survey Work including production of Survey Drawings to an agreed scale will be for the following Project Components: i) Topographic Survey of Proposed Water Treatment Works Sites at 10m grid intervals including preparation of updated Layout Plan with contours at 0.5m interval, ii) Engineering Survey of Treated Water Transmission Main including preparation of updated plan and profile, approximate length 4km | | | | |
| 5.2 | Add 10% for profit, administration, attendance upon, | % | | | |

| | | | | | |
|---|--|------|------|---------|--|
| | overheads, etc. for Item 5.1 above. | | | | |
| 6 | Supervision of Works | | | | |
| 6.1 | Supervision: Allow a P.C. sum of Ksh. 400,000 for supervision of the works to be used as directed by the Engineer. | L.S | ITEM | 400,000 | |
| 6.2 | Allow a provisional PC sum of Ksh. 300,000 for provision of running and maintaining of supervision vehicle. | L.S | ITEM | 300,000 | |
| 6.3 | Add....% for profit, administration, attendance upon, overheads, etc for Items 6.1 and 6.2 above | % | | | |
| PAGE TOTAL CARRIED FORWARD TO COLLECTION | | | | | |
| 7 | Relocation of Services | | | | |
| 7.1 | Allow a P.C. Sum of Kshs. 250,000/ for Payments demanded by the Authorities for relocation of existing services (water pipelines, power cable), Road crossings, etc., including any statutory levies to relevant Authorities. Liaison with the relevant Authorities shall be the responsibility of the Contractor for the timely execution of the Works. | Item | P.C | 250,000 | |
| 7.2 | Add 10% for profit, administration, attendance upon, overheads, etc. for Item 7.2 above. | % | | | |
| 8 | <u>OTHER WORKS OBLIGATIONS</u> | | | | |
| 8.1 | Allow for any costs associated with compliance with Environmental, Health and Safety Requirements as specified in the Particular Specifications, the Environmental and Social Management and Monitoring Plan | Item | L.S. | | |

| | | | | | |
|---|---|------|-----|---------|--|
| | (ESMMP) as required by Government Agencies and Prevailing Legislation. | | | | |
| 8.2 | Allow Ksh. 200,000 for branding of works as per the Engineers instruction and with TWWDA logo and colours | Item | L.S | 200,000 | |
| PAGE TOTAL CARRIED TO COLLECTION | | | | | |
| PRELIMINARIES SUMMARY | | | | | |
| | <i>Collection 1</i> | | | | |
| | <i>Collection 2</i> | | | | |
| | <i>Collection 3</i> | | | | |
| PRELIMINARIES BILL TOTAL CARRIED FORWARD TO SUMMARY PAGE | | | | | |
| BILL NO. 2: - DAYWORKS (INDICATIVE QUANTITIES) | | | | | |

| ITEM | DESCRIPTION | Unit | QTY | RATE (KSHS) | AMOUNT (KSHS) |
|------|---|------|-----|-------------|---------------|
| 2.1 | THE WHOLE OF THIS BILL IS PROVISIONAL LABOUR | | | | |
| | The rates should include for all costs, such as insurance, travelling time, overtime, accommodation, use of small tools of trade, supervision, overheads and profit. Only time engaged upon | | | | |

| | | | | | |
|------------|---|-------|-----|--|--|
| | work will be paid for: | | | | |
| 2.1.1 | Unskilled labour | Hrs | 150 | | |
| 2.1.2 | Semi-skilled labour | Hrs | 50 | | |
| 2.1.3 | Skilled Labour | Hrs | 50 | | |
| | | | | | |
| 2.2 | PLANT | | | | |
| | The rates should be included for all operational and maintenance costs, fuel, oil, operators, turn boys, Supervision, overhead and profits. Only the time employed on work will be paid for and the rates should include the idle, travelling and overtime. | | | | |
| 2.2.1 | Compressor CP with 2 jacks | Hrs | 16 | | |
| | | | | | |
| 2.2.2 | Concrete vibrator (petrol or diesel) | Hrs | 48 | | |
| 2.2.3 | Portable water pump 50mp 50mm inclusive of hoses, couplings, valves and strainer) | Hrs | 32 | | |
| | | | | | |
| 2.3 | MATERIALS | | | | |
| | | | | | |
| 2.3.1 | Ordinary Portland cement | tonne | 3 | | |
| | | | | | |
| 2.3.2 | Mild steel/High yield steel | tonne | 0.5 | | |
| | | | | | |
| | BILL NO.2 TOTAL CARRIED OVER TO SUMMARY PAGE | | | | |

BILL NO. 2

**KAHARO TREATMENT WORKS - STILLING WELL, CHEMICAL DOSING
CHANNEL & FLOCCULATION BASIN**

| ITEM No. | DESCRIPTION | UNIT | QTY | RATE Kshs | A M O U N T KS hs. |
|-------------|---|------|------|--------------|---|
| 1 | GENERAL SITE CLEARANCE | | | | |
| 1.1 | Clear site of all vegetation, including grubbing up roots, stripping the top soil and cart away arising material as directed by the Engineer | Ha. | 0.12 | | |
| 1.2 | Bulk Excavation (Provisional) | | | | |
| | <i>The following works shall be for general levelling of the site including benching and shall not be inclusive of the foundation trenches. Levels to be determined on site</i> | | | | |
| 1.2.1 | Excavate in normal soil depth n.e. 0.25m and dispose excavated material as directed by the Engineer | m2 | 1120 | | |
| 1.2.2 | Excavate, bench, haul, spread, water and compact suitable impermeable soil in layers not exceeding 150mm thick to achieve a MDD of 95% in areas specified by the Engineer. Contractor to identify and acquire the suitable impermeable soil | m3 | 1398 | | |

| | | | | | |
|---|--|----|-----|--|--|
| | approved by the Engineer on site in accordance to Drawing No. TWWDA/KWP/TWS-2 | | | | |
| 1.2.3 | Spread top soil to slopping sides of site and plant approved grassing material. | m2 | 180 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |
| 2 | <u>STILLING WELL</u> | | | | |
| | - | | | | |
| 2.1 | <u>Excavation</u> | | | | |
| | - | | | | |
| | The rates shall include for all strutting, shuttering, stabilising the excavation faces and keeping the excavation free of water by pumping, bailing or other means. | | | | |
| | - | | | | |
| | Excavate for foundations, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by the Engineer. | | | | |
| | - | | | | |
| 2.1.1 | Maximum depth n.e. 1.0 m | m3 | 7 | | |
| | - | | | | |
| 2.1.2 | -Ditto - for depth 1 - 2 m | m3 | 4 | | |
| | - | | | | |
| 2.1.3 | Extra over Item 1.1.1 & 1.1.2 for excavation in rock Class 'A', blasting not permitted (Provisional) | m3 | 1 | | |
| | - | | | | |
| 2.1.4 | -Ditto- for excavation in rock Class 'B', | m3 | 2 | | |

| | | | | | |
|------------|--|----|------|--|--|
| | blasting not permitted (Provisional) | | | | |
| | | | | | |
| 2.2 | <u>Concrete Works</u> | | | | |
| | - | | | | |
| | Provide, mix and place concrete as directed | | | | |
| | - | | | | |
| 2.2.1 | Plain concrete Class 15/20 in 75mm blinding layer under column bases | m2 | 6 | | |
| | - | | | | |
| | Vibrated, reinforced concrete class 25/20 in:- | | | | |
| | - | | | | |
| 2.2.2 | Column bases | m3 | 3 | | |
| | - | | | | |
| 2.2.3 | Columns | m3 | 1 | | |
| | - | | | | |
| 2.2.4 | 200mm thick base slab | m3 | 3 | | |
| | - | | | | |
| 2.2.5 | 200mm thick R.C walls | m3 | 10 | | |
| | - | | | | |
| 2.2.6 | 150mm thick R.C baffle walls | m3 | 2 | | |
| | - | | | | |
| 2.3 | <u>Reinforcement</u> | | | | |
| | - | | | | |
| | Provide and fix high tensile steel reinforcement to SRN 127 including cutting, bending, propping, with spacers and tying as specified. | | | | |
| | - | | | | |
| 2.3.1 | Reinforcement, all diameters | kg | 2280 | | |
| 2.4 | <u>Formwork</u> | | | | |
| | - | | | | |
| | Provide and fix shuttering including propping, strutting and striking all as specified | | | | |
| | - | | | | |

| | | | | | |
|-------|---|----|----|--|--|
| | (i) Vertical Formwork - Class F1 Finish | | | | |
| | - | | | | |
| 2.4.1 | Vertical sides of Column bases, width n.e 0.4m | m | 20 | | |
| | - | | | | |
| | (ii) Vertical Formwork - Class F3 Finish | | | | |
| | - | | | | |
| 2.4.2 | Vertical sides of Columns-width n.e 0.3m | m | 40 | | |
| | - | | | | |
| 2.4.3 | Sides of 200mm thick base slab | m | 14 | | |
| | - | | | | |
| 2.4.4 | Outer faces of stilling well walls-width n.e 3.8m | m2 | 52 | | |
| | - | | | | |
| 2.4.5 | Inner faces of the stilling well walls-width n.e 3.8m | m2 | 46 | | |
| | - | | | | |
| 2.4.6 | Sides of the baffle wall in stilling well | m2 | 16 | | |
| | - | | | | |
| | (i) Horizontal Formwork - Class F1 Finish | | | | |
| | - | | | | |
| 2.4.7 | Soffit of Stilling Well Base Slab | m2 | 12 | | |
| | - | | | | |
| | (i) Horizontal Formwork - Class F3 Finish | | | | |
| | - | | | | |
| 2.4.8 | Soffit of baffle wall in stilling well, width n.e 0.15m | m | 3 | | |
| | - | | | | |
| | Other Formwork | | | | |
| | - | | | | |
| 2.4.9 | Boxing out for Pipes in 200mm thick R.C. Walls for Stilling Well pipe diameters n.e. 250mm and making good after pipe inserts installation. | Nr | 2 | | |

| | | | | | |
|------------|--|----|----|--|--|
| | - | | | | |
| 2.4.10 | Boxing out for Chemical dosing channel-1250mm x 800mm and making good after construction of chemical dosing channel | Nr | 1 | | |
| | - | | | | |
| 2.5 | <u>Concrete Surface Finish</u> | | | | |
| | - | | | | |
| 2.5.1 | Provide Class UF3 Finish for top of base slab of stilling well | m2 | 12 | | |
| | - | | | | |
| 2.6 | <u>Construction Joints</u> | | | | |
| | - | | | | |
| | Provide and install the following waterstops in construction joints including all surface treatment, formwork, forming of rebate 20mm x 20mm and sealing of rebate with polysulphide sealant all as per Drawings and Specifications. | | | | |
| | - | | | | |
| 2.6.1 | 200mm wide expandite super-cast water foil PVC or similar approved waterstop in construction joints in walls. | m | 28 | | |
| | - | | | | |
| 2.7 | <u>Metalwork</u> | | | | |
| | - | | | | |
| | All steel work to be completely cleaned by acid dipping prior to galvanising. | | | | |
| | - | | | | |
| 2.7.1 | Provide and fix uPVC coated cast irons steps in stilling well as detailed in DRG No. TWWDA/KTW/FB-02 | Nr | 12 | | |

| | | | | | |
|-------|---|------|-----|--|--|
| | - | | | | |
| 2.8 | <u>Leak Proof Testing</u> | | | | |
| | - | | | | |
| 2.8.1 | Allow for leak proof testing of Stilling Well as specified | Item | L.S | | |
| | - | | | | |
| 2.9 | <u>Pipework Fittings & Valves</u> | | | | |
| | <u>Supply, Transport to Site and Store in Secure Place Including Jointing Material, Bolts, Gaskets, Packing, Jointing Glue, etc. As Applicable</u> | | | | |
| | - | | | | |
| | <u>Raw Water Gravity Main Pipework - Approved Lined Ferrous Pipes</u> | | | | |
| | - | | | | |
| 2.9.1 | 250mm dia. Flanged 900 bend with plain end beveled (Mark 1) | Nr | 1 | | |
| | - | | | | |
| 2.9.2 | 250mm dia. Double flanged pipe with puddle flange at 400 mm from the flanged end,length 800mm (Mark 2) | Nr | 2 | | |
| | - | | | | |
| 2.9.3 | 250mm dia. All flanged 90 ⁰ bend (Mark 3) | Nr | 2 | | |
| | - | | | | |
| 2.9.4 | 250mm dia. flanged spigot pipe 4500mm long (cut to suit on site) (Mark 4) | Nr | 1 | | |
| | - | | | | |
| 2.9.5 | 250mm dia. flange adaptor (Mark 5) | Nr | 1 | | |
| | - | | | | |
| 2.9.6 | 250mm dia. flanged spigot pipe 1200mm long (Mark 6) | Nr | 1 | | |

| | | | | | |
|--------|---|----|---|--|--|
| | - | | | | |
| 2.9.7 | 250mm dia. coupling (Mark 7) | Nr | 1 | | |
| | - | | | | |
| 2.9.8 | 250mm dia. All flanged 90° Horizontal bend | Nr | 1 | | |
| | | | | | |
| 2.9.9 | 250mm double. flanged pipe 6000mm long (cut to suit on site for connection to existing upvc pipe) | Nr | 1 | | |
| | | | | | |
| 2.9.10 | 250mm Flanged Upvc to GI adaptor | Nr | 1 | | |
| | <u>Scour Pipework - Approved Lined Ferrous Pipes</u> | | | | |
| | - | | | | |
| 2.9.8 | 150mm dia. flanged spigot pipe 600mm long with puddle flange at 100mm from plain end (Mark i) | Nr | 1 | | |
| | - | | | | |
| 2.9.9 | 150mm dia all flanged 90° bend (Mark ii) | Nr | 2 | | |
| | - | | | | |
| 2.9.10 | 150mm dia flanged spigot pipe cut to suit on site, length 950mm (Mark iii) | Nr | 1 | | |
| | - | | | | |
| 2.9.11 | 150mm dia flanged adaptor (Mark iv) | Nr | 2 | | |
| | - | | | | |
| 2.9.12 | 150mm Flanged spigot pipe cut to suit on site, length 1500 (Mark v) | Nr | 1 | | |
| | - | | | | |
| 2.9.13 | 150mm dia Gate valve with extension spindle 1.2m long (short face) with a T-key for operation (Mark vi) | Nr | 1 | | |
| | - | | | | |

| | | | | | |
|--------|--|----|---|--|--|
| 2.9.14 | 150mm dia special flanged 900 bend with plain end beveled (mark vii) | Nr | 1 | | |
| | - | | | | |
| | <u>Transport From Site Store, Install, Test & Commission</u> | | | | |
| | - | | | | |
| | <u>Raw Water Gravity Main Pipework - Approved Lined Ferrous Pipes</u> | | | | |
| | - | | | | |
| 2.9.15 | 250mm dia. Flanged 900 bend with plain end beveled (Mark 1) | Nr | 1 | | |
| | - | | | | |
| 2.9.16 | 250mm dia. Double flanged pipe with puddle flange at 400 mm from the flanged end,length 800mm (Mark 2) | Nr | 2 | | |
| | - | | | | |
| 2.9.17 | 250mm dia. All flanged 900 bend (Mark 3) | Nr | 2 | | |
| | - | | | | |
| 2.9.18 | 250mm dia. flanged spigot pipe 4500mm long (cut to suit on site) (Mark 4) | Nr | 1 | | |
| | - | | | | |
| 2.9.19 | 250mm dia. flange adaptor (Mark 5) | Nr | 1 | | |
| | - | | | | |
| 2.9.20 | 250mm dia. flanged spigot pipe 1200mm long (Mark 6) | Nr | 1 | | |
| | - | | | | |
| 2.9.21 | 250mm dia. coupling (Mark 7) | Nr | 1 | | |
| | | | | | |
| 2.9.8 | 250mm dia. All flanged 90° Horizontal bend | Nr | 1 | | |
| | | | | | |
| 2.9.9 | 250mm double. flanged pipe 6000mm long (cut to suit on site for | Nr | 1 | | |

| | | | | | |
|---|---|----|---|--|--|
| | connection to existing upvc pipe) | | | | |
| 2.9.10 | 250mm Flanged Upvc to GI adaptor | Nr | 1 | | |
| | <u>Sour Pipework - Approved Lined Ferrous Pipes</u> | | | | |
| | - | | | | |
| 2.9.22 | 150mm dia. flanged spigot pipe 600mm long with puddle flange at 100mm from plain end (Mark i) | Nr | 1 | | |
| | - | | | | |
| 2.9.23 | 150mm dia all flanged 900 bend (Mark ii) | Nr | 2 | | |
| | - | | | | |
| 2.9.24 | 150mm dia flanged spigot pipe cut to suit on site, length 800mm (Mark iii) | Nr | 1 | | |
| | - | | | | |
| 2.9.25 | 150mm dia flanged adaptor (Mark iv) | Nr | 1 | | |
| | - | | | | |
| 2.9.26 | 150mm Flanged spigot pipe cut to suit on site,length 1500 (Mark v) | Nr | 1 | | |
| | - | | | | |
| 2.9.27 | 150mm dia Gate valve with extension spindle 1.2m long (short face) with a T-key for operation (Mark vi) | Nr | 1 | | |
| | - | | | | |
| 2.9.28 | 150mm dia special flanged 900 bend with plain end beveled (mark vii) | Nr | 1 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |
| 3 | <u>CHEMICAL DOSING CHANNEL & DOSED WATER CHANNEL</u> | | | | |
| | - | | | | |
| 3.1 | <u>Concrete Works</u> | | | | |

| | | | | | |
|------------|--|----|------|--|--|
| | - | | | | |
| | Provide, mix and place concrete as directed | | | | |
| | - | | | | |
| | Vibrated Reinforced Concrete Class 25/20 in:- | | | | |
| | - | | | | |
| 3.1.2 | Base of channel | m3 | 3 | | |
| | - | | | | |
| 3.1.3 | Walls of channel | m3 | 8 | | |
| | - | | | | |
| 3.2 | <u>Reinforcement</u> | | | | |
| | - | | | | |
| | Provide and fix high tensile steel reinforcement to SRN 127 including cutting, bending, propping, with spacers and tying as specified. | | | | |
| | - | | | | |
| 3.2.1 | Reinforcement, all diameters | kg | 1320 | | |
| | - | | | | |
| 3.3 | <u>Formwork</u> | | | | |
| | - | | | | |
| | Provide and fix shuttering including propping, strutting and striking all as specified. | | | | |
| | - | | | | |
| | (ii) Vertical Formwork - Class F3 Finish | | | | |
| | - | | | | |
| 3.3.1 | Sides of 200mm thick channel base slab | m | 17 | | |
| | - | | | | |
| 3.3.2 | Walls of channel - width n.e. 0.1n | m | 42 | | |
| | - | | | | |
| 3.3.3 | External walls of channel - width n.e. 2.0m | m2 | 24 | | |
| | - | | | | |
| 3.3.4 | Internal walls of the channel - width n.e. 2.0m | m2 | 24 | | |
| | - | | | | |

| | | | | | |
|-------|---|----|----|--|--|
| 3.3.5 | Vertical sides of the wall-width n.e 0.3 | m | 1 | | |
| | - | | | | |
| 3.3.6 | Ditto for-width n.e 0.2 | m | 1 | | |
| | - | | | | |
| | Other Formwork | | | | |
| | - | | | | |
| 3.3.7 | Allow for 75mm x 75mm rebate in walls of dosed water channel for cover slabs. | m | 45 | | |
| | - | | | | |
| 3.3.8 | Boxouts for Pipes in 200mm thick R.C. Walls for chemical dosing pipe diameter n.e 150 and making good after pipe inserts installation. | Nr | 1 | | |
| | - | | | | |
| 3.4 | Concrete Surface Finish | | | | |
| | - | | | | |
| 3.4.1 | Provide Class UF3 Finish for top of base slab of channel | m2 | 13 | | |
| | - | | | | |
| 3.5 | Construction Joints - Water Bar | | | | |
| | - | | | | |
| | Provide and install the following waterstops in construction joints including all surface treatment, formwork, forming of rebate 20mm x 20mm and sealing of rebate with polysulphide sealant all as per Drawings and Specifications | | | | |
| 3.5.1 | 200mm wide expandite super-cast water foil PVC or similar approved waterstop in vertical construction joints in walls | m | 40 | | |

| | | | | | |
|------------|---|----|----|--|--|
| | - | | | | |
| 3.6 | <u>Metal Work</u> | | | | |
| | - | | | | |
| | All steelwork to be completely cleaned by acid dipping prior to galvanizing | | | | |
| | - | | | | |
| 3.6.1 | Provide and fix GMS open mesh cover with frame size 0.6m x 0.95m, to dosing channel, as per details on Drg. No. TWWDA/KTW/FB-01. Include for provision and fixing of fish tailed lugs into concrete walls. | Nr | 1 | | |
| | - | | | | |
| 3.6.2 | Provide and fix GMS support bracket for GMS open mesh cover. Include for all materials (M.S. angle, plate, bolts, etc) and necessary drilling and fixing to concrete wall as required. | Nr | 1 | | |
| | - | | | | |
| 3.6.3 | Provide and fix 900 mm high level balustrades of 40 mm diameter tubing Class B throughout, consisting of handrail and parallel middle rail 450 mm below the hand rail with balusters at maximum 1500 mm centres all as detailed on Drg. No. TWWDA/KTW/FB-02 | m | 28 | | |
| | - | | | | |
| 3.6.4 | Provide and fix 750mm wide steel access staircase to chemical dosing channel as detailed on Drg. No. | Nr | 1 | | |

| | | | | | |
|---|--|----|----|--|--|
| | TWWDA/KTW/ FB-01 and TWWDA/KTW/ FB-02 | | | | |
| 3.7 | - Miscellaneous | | | | |
| | - | | | | |
| 3.7.1 | Supply & fix Measuring Gauge as per details on Drg. No TWWDA/KTW/ FB-04. | Nr | 1 | | |
| | - | | | | |
| 3.7.2 | Supply & fix thin plate measuring weir as per details on Drg. No TWWDA/KTW/ FB-04. | Nr | 1 | | |
| | - | | | | |
| 3.8 | Precast Concrete Walkway Slabs | | | | |
| | - | | | | |
| | Precast concrete Class 25/20 finished fair on all surfaces and reinforced as shown on the drawings. Provide and fix:- | | | | |
| | - | | | | |
| 3.8.1 | 75mm thick cover slab size 950mm x 400mm wide including 2Nr. Mild steel key holes cast with slab constructed as per details on Drg. No. TWWDA/KTW/ FB-04. for dosed water. channel | Nr | 32 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |
| 4 | FLOCCULATI ON BASIN | | | | |
| | - | | | | |
| | EARTHWORK S | | | | |
| | - | | | | |
| 4.1 | EXCAVATION | | | | |
| | - | | | | |

| | | | | | |
|------------|---|----|-----|--|--|
| | The rates shall include for all strutting, shuttering, stabilising the excavation faces and keeping the excavation free of water by pumping, bailing or other means. | | | | |
| | - | | | | |
| | Bulk excavations and top soil stripping for all structures are measured under (General Site Clearance) | | | | |
| | - | | | | |
| | Excavate below stripped level to formation level in common material, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by the Engineer. | | | | |
| | - | | | | |
| 4.1.1 | Maximum depth n.e. 1.0 m | m3 | 23 | | |
| | - | | | | |
| 4.1.2 | Ditto- but for scour chambers | m3 | 5 | | |
| | - | | | | |
| 4.1.3 | Extra over Items 3.1.1 to 3.1.2 for excavation in rock Class 'A', blasting not permitted (Provisional) | m3 | 2 | | |
| | - | | | | |
| 4.1.4 | -Ditto- for excavation in rock Class 'B', blasting not permitted (Provisional) | m3 | 3 | | |
| | - | | | | |
| 4.1.5 | -Ditto- for excavation in rock Class 'C', blasting not permitted (Provisional) | m3 | 1.8 | | |
| | - | | | | |
| 4.2 | <u>FILL</u> | | | | |
| | - | | | | |

| | | | | | |
|------------|--|----|-----|--|--|
| 4.2.1 | Transport approved excavated material from site stock pile and use as fill. Compact in 200mm thick layers,making up levels as directed by the Engineer. Compaction tests to be done for each layer as directed by the Engineer and to be included in the contractor's rates. | m3 | 161 | | |
| | - | | | | |
| 4.2.2 | Provide, lay and level out the crushed stone, sand or gravel blinding 50mm thick to surface of filling, including watering and rolling to achieve satisfactory compaction. | m2 | 130 | | |
| | - | | | | |
| 4.3 | <u>CONCRETE WORKS</u> | | | | |
| | - | | | | |
| | Provide, mix and place concrete as directed | | | | |
| | - | | | | |
| 4.3.1 | Plain concrete Class 15/20 in 75mm blinding layer under retaining walls strip footing | m2 | 51 | | |
| | - | | | | |
| 4.3.2 | Plain concrete Class 15/20 in 75mm blinding layer under base slab of the flocculation basin | m2 | 66 | | |
| | - | | | | |
| 4.3.3 | Plain concrete Class 15/20 in 75mm blinding layer under scour chamber base. | m2 | 6 | | |
| | - | | | | |
| | Vibrated, Reinforced | | | | |

| | | | | | |
|------------|--|----|-------|--|--|
| | concrete Class 25/20 in:- | | | | |
| | - | | | | |
| 4.3.4 | Retaining walls Strip footing | m3 | 21 | | |
| | - | | | | |
| 4.3.5 | Flocculation basin base slab | m3 | 29 | | |
| | - | | | | |
| 4.3.6 | Walls | m3 | 52 | | |
| | - | | | | |
| 4.3.7 | Tie Beams | m3 | 1.8 | | |
| | - | | | | |
| | Precast concrete class 25/20 in:- | | | | |
| | - | | | | |
| 4.3.8 | Provide and fix precast concrete Baffle walls each 150mm thick; 9.85m long ; depth ranging between 1.61m - 1.88m finished fair on all faces as detailed in drawing No. TWWDA/KTW/FB-03 | Nr | 8 | | |
| | - | | | | |
| 4.3.9 | Ditto but 9.75m long ; depth ranging between 1.61m -1.68m | Nr | 9 | | |
| | - | | | | |
| 4.4 | <u>REINFORCEMENT</u> | | | | |
| | - | | | | |
| | Provide and fix high tensile steel reinforcement to SRN 127 including cutting, bending, propping, with spacers and tying as specified. | | | | |
| | - | | | | |
| 4.4.1 | Reinforcement, all diameters | kg | 12525 | | |
| | - | | | | |
| 4.5 | <u>FORMWORK</u> | | | | |
| | - | | | | |
| | Provide and fix shuttering including propping, strutting and striking all as specified | | | | |

| | | | | | |
|--------|--|----|-----|--|--|
| | - | | | | |
| | (i) Vertical Formwork - Class F1 Finish | | | | |
| | - | | | | |
| 4.5.1 | Sides of 400mm thick retaining wall footing | m | 82 | | |
| | - | | | | |
| 4.5.2 | Sides of wall, width n.e 0.1m kicker | m | 85 | | |
| | - | | | | |
| 4.5.3 | Walls below floor level | m2 | 169 | | |
| | - | | | | |
| 4.5.4 | Inner faces of walls above floor level | m2 | 35 | | |
| | - | | | | |
| | (ii) Vertical Formwork - Class F3 Finish | | | | |
| | - | | | | |
| 4.5.5 | Sides of 250mm thick sloping base slab - (1 in 45 slope) | m | 37 | | |
| | - | | | | |
| 4.5.6 | Sides of walls- width n.e 0.1m kicker | m | 85 | | |
| | - | | | | |
| 4.5.7 | Inner faces of walls above finished ground level | m2 | 44 | | |
| | - | | | | |
| 4.5.8 | Walls above finished ground level | m2 | 67 | | |
| | - | | | | |
| 4.5.9 | Tie beam width n.e 0.2 m | m | 25 | | |
| | - | | | | |
| | (iii) Horizontal Formwork - Class F1 Finish | | | | |
| | - | | | | |
| 4.5.10 | Soffit of the tie beam-width n.e 0.75m | m | 12 | | |
| | - | | | | |
| | (iv) Horizontal Formwork - Class F1 Finish | | | | |
| | - | | | | |
| 4.5.11 | Sloping sides of cantilever support for headstock | m2 | 1.2 | | |

| | | | | | |
|------------|--|----|-----|--|--|
| | - | | | | |
| | (v) Other Formwork | | | | |
| | - | | | | |
| 4.5.12 | Boxouts for Pipes in 300mm thick R.C. Walls for scour pipe diameter n.e. 150mm and making good after pipe inserts installation | Nr | 2 | | |
| | - | | | | |
| 4.5.13 | Boxouts for 600mm x 1000mm inlet control penstock in 300mm thick RC wall and making good after installation of the penstocks. | Nr | 2 | | |
| | - | | | | |
| 4.5.14 | Boxouts for 600mm x 1300mm outlet control penstock in 300mm thick RC wall and making good after installation of the penstocks. | Nr | 2 | | |
| | - | | | | |
| 4.6 | <u>CONCRETE SURFACE FINISH</u> | | | | |
| | - | | | | |
| 4.6.1 | Provide Class UF3 Finish for top of base slab of basin | m2 | 118 | | |
| | - | | | | |
| 4.7 | <u>CONSTRUCTION JOINTS</u> | | | | |
| | - | | | | |
| | Provide and install the following waterstops in construction joints including all surface treatment, formwork forming of rebate and sealing of rebate with polysulphide sealant all as per Drawings and Specification. | | | | |
| | - | | | | |

| | | | | | |
|-------|--|------|-----|--|--|
| 4.7.1 | 200mm wide expandite super-cast water foil PVC or similar approved waterstop in construction joints in walls (Provisional) | m | 42 | | |
| | - | | | | |
| 4.8 | <u>LEAK PROOF TESTING</u> | | | | |
| | - | | | | |
| 4.8.1 | Allow for leak proof testing of Flocculation Basin as specified | Item | L.S | | |
| | - | | | | |
| 4.9 | <u>PIPEWORK, FITTINGS & VALVES</u> | | | | |
| | - | | | | |
| | <u>Supply, Transport to Site and Store in Secure Place including Jointing Material, Bolts, Gaskets, Packing, Jointing Glues, etc as Applicable.</u> | | | | |
| | - | | | | |
| 4.9.1 | Special 600mm x 1000mm opening inlet control penstock with extended spindle and headstock (non-rising stem type) (Hambaker or approved equivalent). | Nr | 1 | | |
| | - | | | | |
| 4.9.2 | Special 600mm x 1300mm opening outlet control penstock, non-rising stem type with extended spindle (Hambaker or approved equivalent) | Nr | 1 | | |
| | - | | | | |
| | <u>Sour Pipework - Approved Lined Ferrous Pipes</u> | | | | |
| | - | | | | |

| | | | | | |
|--------|---|----|---|--|--|
| 4.9.3 | 150mm dia. flanged spigot pipe 600mm long with puddle flange at 150mm from plain end (Mark h) | Nr | 1 | | |
| 4.9.4 | 150mm dia all flanged 90° bend (Mark i) | Nr | 2 | | |
| | - | | | | |
| 4.9.5 | 150mm dia flanged spigot pipe cut to suit on site, length 1410mm (Mark j) | Nr | 1 | | |
| | - | | | | |
| 4.9.6 | 150mm dia flanged adaptor (Mark k) | Nr | 4 | | |
| | - | | | | |
| 4.9.7 | 150mm Flanged spigot pipe cut to suit on site,length 1750mm (Mark l) | Nr | 1 | | |
| | - | | | | |
| 4.9.8 | 150mm dia Gate valve with extension spindle 1.2m long (short face) with a T-key for operation (Mark m) | Nr | 1 | | |
| | - | | | | |
| 4.9.9 | 150mm dia flanged 90° bend with plain end bevelled (Mark n) | Nr | 2 | | |
| | - | | | | |
| 4.9.10 | 150mm Flanged spigot pipe cut to suit on site,length 790mm (Mark o) | Nr | 1 | | |
| | - | | | | |
| | <u>Transport From Site Store, Install, Test and Commission</u> | | | | |
| | - | | | | |
| 4.9.11 | Special 600mm x 1000mm opening inlet control penstock with extended spindle and headstock (non-rising stem type) (Hambaker or approved equivalent). | Nr | 2 | | |
| | - | | | | |

| | | | | | |
|--------|--|----|---|--|--|
| 4.9.12 | Special 600mm x 1300mm opening outlet control penstock, non-rising stem type with extended spindle (Hambaker or approved equivalent) | Nr | 2 | | |
| | - | | | | |
| | <u>Sour Pipework - Approved Lined Ferrous Pipes</u> | | | | |
| | - | | | | |
| 4.9.13 | 150mm dia. flanged spigot pipe 600mm long with puddle flange at 150mm from plain end (Mark h) | Nr | 2 | | |
| | - | | | | |
| 4.9.14 | 150mm dia all flanged 90 bend (Mark i) | Nr | 4 | | |
| | - | | | | |
| 4.9.15 | 150mm dia flanged spigot pipe cut to suit on site, length 1410mm (Mark j) | Nr | 2 | | |
| | - | | | | |
| 4.9.16 | 150mm dia flanged adaptor (Mark k) | Nr | 4 | | |
| | - | | | | |
| 4.9.17 | 150mm Flanged spigot pipe cut to suit on site,length 1750mm (Mark l) | Nr | 1 | | |
| | - | | | | |
| 4.9.18 | 150mm dia Gate valve with extension spindle 1.2m long (short face) with a T-key for operation (Mark m) | Nr | 2 | | |
| | - | | | | |
| 4.9.19 | 150mm dia flanged 90° bend with plain end bevelled (Mark n) | Nr | 2 | | |
| | - | | | | |
| 4.9.20 | 150mm Flanged spigot pipe cut to suit on site,length 790mm (Mark o) | Nr | 1 | | |
| | | | | | |

| | | | | | |
|-------------|---|----|-----|---------|--|
| 4.10 | Dosing Units | | | | |
| 4.10.1 | Allow a PC sum of 100,000 for supply of Alum dosing unit together with alum delivery pipes and pipe conduits as specified by the engineer. | LS | 1 | 100,000 | |
| 4.10.2 | Install the alum dosing unit , delivery pipes and conduits for the alum dosing sytem and chlorine dosing system. | LS | 1 | | |
| | - | | | | |
| 4.10 | <u>MISCELLANEOUS</u> | | | | |
| | - | | | | |
| 4.10.1 | Provide and apply Epoxy wall and floor coating, "MASTERTOP 1110T" or approved equivalent on internal surfaces of walls and floor of Flocculation Basin. | m2 | 199 | | |
| | - | | | | |
| 4.11 | <u>FLOCCULATED WATER CHANNEL</u> | | | | |
| | - | | | | |
| | <u>Concrete works</u> | | | | |
| | - | | | | |
| 4.11.1 | Provide, mix and place concrete as directed | | | | |
| | - | | | | |
| | <u>Vibrated, Reinforced concrete Class 25/20 in</u> | | | | |
| | - | | | | |
| 4.11.2 | Walls | m3 | 2 | | |
| | - | | | | |
| 4.11.3 | channel Slab | m3 | 4 | | |
| | - | | | | |
| 4.12 | <u>REINFORCEMENT</u> | | | | |
| | - | | | | |
| | Provide and fix high tensile steel reinforcement to SRN 127 including cutting, | | | | |

| | | | | | |
|-------------|--|----|-----|--|--|
| | bending, propping, with spacers and tying as specified | | | | |
| | - | | | | |
| 4.12.1 | Reinforcement, all diameters | kg | 750 | | |
| | - | | | | |
| 4.13 | <u>FORMWORK</u> | | | | |
| | - | | | | |
| | Provide and fix shuttering including propping, strutting and striking all as specified | | | | |
| | - | | | | |
| | (i) Vertical Formwork - Class F1 Finish | | | | |
| | - | | | | |
| 4.13.1 | Sides of 200mm thick slab | m | 9 | | |
| | - | | | | |
| 4.13.2 | walls width n.e 0.1m kicker | m | 8 | | |
| | - | | | | |
| 4.13.3 | walls width n.e 1.6 m | m2 | 13 | | |
| | - | | | | |
| | (ii) Vertical Formwork - Class F3 Finish | | | | |
| | - | | | | |
| 4.13.4 | walls width n.e 0.1m kicker | m | 7 | | |
| | - | | | | |
| 4.13.5 | walls width n.e 1.6 m | m2 | 27 | | |
| | - | | | | |
| | (iii) Horizontal Formwork - Class F1 Finish | | | | |
| | - | | | | |
| 4.13.6 | Soffit of flocculated water channel | m2 | 12 | | |
| | - | | | | |
| 4.14 | <u>CONCRETE SURFACE FINISH</u> | | | | |
| | - | | | | |
| | Provide Class UF3 Finish for top of base slab of flocculated water channel | m2 | 7 | | |
| | - | | | | |

| | | | | | |
|--------|--|----|----|--|--|
| | <u>Metal Work</u> | | | | |
| | - | | | | |
| | All steelwork to be completely cleaned by acid dipping prior to galvanizing | | | | |
| | - | | | | |
| 4.14.1 | Provide and fix GMS open mesh cover with frame size 1.475m x 1.25 m, to flocculated water channel as approved by the Engineer. Include for provision and fixing of fish tailed lugs into concrete walls. | Nr | 6 | | |
| | | | | | |
| 4.14.2 | Provide and fix 900 mm high level balustrades of 40 mm diameter tubing Class B throughout, consisting of handrail and parallel middle rail 450 mm below the hand rail with balusters at maximum 1500 mm centres all to Engineer's instructions | m | 20 | | |
| | - | | | | |
| | <u>Precast Concrete</u> | | | | |
| | - | | | | |
| | Precast concrete Class 25/20 finished fair on all surfaces and reinforced as shown on the drawings. Provide and fix:- | | | | |
| | - | | | | |
| 4.14.3 | 75mm thick cover slab size 1250mm x 400mm wide including 2Nr. Mild steel key holes cast with slab constructed as per details on Drg. No. TWWDA/KTW/FB-04. for | Nr | 11 | | |

| | | | | | |
|---|--|----|-------|--|--|
| | flocculated water channel | | | | |
| | - | | | | |
| 4.15 | <u>Scour Chamber Walling</u> | | | | |
| | - | | | | |
| | <u>Natural Stone Block Walling, Medium Chisel Dressed, Reinforced with 6mm dia. M.S. Reinforcement at Every Alternate Course, and Bedded, Jointed and Pointed in Cement Mortar (1:3):-</u> | | | | |
| | - | | | | |
| 4.15.1 | 200 mm Walling | m2 | 12 | | |
| | - | | | | |
| 4.15.2 | Provide all materials and Render the inside of Chamber Walls with 12.5mm thick Cement Mortar (1:3) | m2 | 10 | | |
| 4.16 | Site Protection works | | | | |
| | Provide, place and fill galvanised hexagonal double twist gabion boxes with rock size 100-250mm fastened together on the embankment as directed by the Engineer. The gabion box 2m*1m*1m with a diaphragm at the center with bracing wires at the centres both vertical and horizontal. Fastening wire shall be galvanised wire. | No | 60.00 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |

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| | | |
| | <u>COLLECTION SHEET</u> | |
| | <i>STILLING WELL, CHEMICAL DOSING CHANNEL AND FLOCCULATION BASIN</i> | |
| | <i>Collection 1</i> | |
| | <i>Collection 2</i> | |
| | <i>Collection 3</i> | |
| | <i>Collection 4</i> | |
| | | |

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BILL No. 3

- - - - -

KAHARO TREATMENT WORKS - SEDIMENTATION TANKS - 2 Nr

| ITEM No. | DESCRIPTION | UNIT | QTY | RATE (Kshs) | AMOUNT (Kshs) |
|-------------|---|------|-----|--------------------|----------------------|
| 1 | <u>EXCAVATION</u> | | | | |
| | The rates shall include for all strutting, shuttering, stabilising the excavation faces, and keeping the excavation free of water by pumping, bailing or other means. | | | | |
| | Bulk excavations and top soil stripping for all structures are measured under General Site Clearance | | | | |
| | Excavate below stripped level to formation level in common material, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by the Engineer. | | | | |

| | | | | | |
|---|---|----|-------|--|--|
| 1.1 | Maximum depth n.e. 1.0 m | m3 | 223.0 | | |
| 1.2 | -Ditto- but maximum depth 1.0 m to 2.0 m | m3 | 223.0 | | |
| 1.3 | -Ditto- but maximum depth 2.0 m to 3.0 m | m3 | 30.9 | | |
| 1.4 | -Ditto- but for the scour chamber | m3 | 8.5 | | |
| 1.5 | Trimming surface for blinding layer of concrete sloping 30 (6%) to horizontal | m2 | 163.0 | | |
| 1.6 | -Ditto- 9o (16%) to horizontal | m2 | 65.0 | | |
| 1.7 | Excavate trench for 150 mm dia. pipes in common material, trimming sides and preparing trench bottoms, backfill with approved hardcore and compact after laying of pipework depth n.e. 1.2 m. Note: Sections under Sedimentation Tank base slab shall be backfilled with Class 20/20 mass concrete surround, measured under Concrete Works. | m | 18.3 | | |
| 1.8 | Transport approved excavated material from site and use as fill and compact in 200 mm layers as specified on site as and where directed by the Engineer. Compaction tests to be done and rates to include for this. | m3 | 5.5 | | |
| 1.9 | Provide approved hardcore and compact in layers of 200mm, blinded with final material 25mm thick | m3 | 80 | | |
| 1.10 | Extra over Items 1.1 to 1.3 for excavation in rock Class 'A', blasting not permitted (Provisional) | m3 | 3.0 | | |
| 1.11 | -Ditto- for excavation in rock Class 'B', blasting not permitted (Provisional) | m3 | 51.0 | | |
| 1.12 | -Ditto- for excavation in rock Class 'C', blasting not permitted (Provisional) | m3 | 21.0 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |

| | | | | | |
|------|---|----|-------|--|--|
| 2 | CONCRETE WORKS | | | | |
| | | | | | |
| | Provide, mix and place concrete as directed | | | | |
| | | | | | |
| 2.1 | Plain concrete Class 15/20 in 75 mm blinding layer under base slab of sedimentation tanks | m2 | 208.0 | | |
| | | | | | |
| 2.2 | Plain concrete Class 15/20 in 75 mm blinding layer under base slab of sludge collection sumps | m2 | 1.6 | | |
| | | | | | |
| 2.3 | Plain concrete Class 15/20 in 75 mm blinding layer under base slab of scour chamber | m2 | 4.0 | | |
| | | | | | |
| 2.4 | Plain concrete Class 20/20 in surround to 150 mm dia. sludge removal pipes | m3 | 7.0 | | |
| | | | | | |
| | Vibrated, Reinforced concrete Class 25/20 in | | | | |
| | | | | | |
| 2.5 | 300 mm Base Slab - Sedimentation tank | m3 | 30.0 | | |
| | | | | | |
| 2.6 | 300 mm Base Slab - Sloping Slab - (6%) to horizontal | m3 | 34.0 | | |
| | | | | | |
| 2.7 | 300 mm Base Slab- Sloping Slab - (7%) to horizontal | m3 | 11.0 | | |
| | | | | | |
| 2.8 | 300 mm Base Slab - Sludge Collection Sumps | m3 | 1.0 | | |
| | | | | | |
| 2.9 | 300 mm Base Slab - Sludge Collection Channel | m3 | 7.0 | | |
| | | | | | |
| 2.10 | 200 mm Base Slab - Scour chamber | m3 | 1.0 | | |
| | | | | | |
| 2.11 | 200 mm Base Slab- Flocculated Water Channel | m3 | 4.0 | | |
| | | | | | |
| 2.12 | 200 mm Base Slab- Sedimentation Tank Inlet Channel | m3 | 2.5 | | |
| | | | | | |
| 2.13 | 200 mm Base slab - Walkways | m3 | 9.0 | | |
| | | | | | |
| 2.14 | 300 mm Walls - Sedimentation Tanks | m3 | 86.0 | | |
| | | | | | |

| | | | | | |
|---|--|----|---------|--|--|
| 2.1 5 | 300 mm Walls - Sludge Collection Sumps | m3 | 1.5 | | |
| 2.1 6 | 300 mm Walls - Sludge Collection Channel | m3 | 3.5 | | |
| 2.1 7 | 200 mm Walls - Scour chamber | m3 | 4.0 | | |
| 2.1 8 | 200 mm Walls - Flocculated Water Channel | m3 | 6.0 | | |
| 2.1 9 | 200 mm Walls - Sedimentation Tank Inlet Channel | m3 | 5.6 | | |
| 2.2 0 | Tie Beams | m3 | 4.0 | | |
| 2.2 1 | Cantilever platforms for Headstocks | m3 | 1.0 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |
| 3 | <u>REINFORCEMENT</u> | | | | |
| | Provide and fix high tensile steel reinforcement to SRN 127 including cutting, bending, propping with spacers and tying as specified | | | | |
| 3.1 | Reinforcement, all diameters | Kg | 29892.0 | | |
| 4 | <u>FORMWORK</u> | | | | |
| | Provide and fix shuttering including propping, strutting and striking all as specified | | | | |
| | (i) Vertical Formwork - Class F1 Finish | | | | |
| 4.1 | Sides of 400 mm Base Slab - Sedimentation Tanks | m2 | 8.0 | | |
| 4.2 | Sides of 300 mm Base Slab - Sedimentation Tanks | m2 | 23.0 | | |
| 4.3 | Sides of 300 mm Base Slab - Sludge collection channel | m2 | 9.7 | | |
| 4.4 | Sides of 300 mm Base Slab - Sludge collection Sumps | m2 | 3.0 | | |

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|------|---|----|-------|--|--|
| 4.5 | Sides of 200 mm Base Slab - Scour chamber | m2 | 1.5 | | |
| 4.6 | Sides of 200 mm Base Slab - Flocculated Water Channel | m2 | 3.4 | | |
| 4.7 | Sides of 200 mm Base Slab - Inlet Water Channel | m2 | 3.0 | | |
| 4.8 | Sides of 200 mm Base Slab - Walkways | m2 | 45.0 | | |
| 4.9 | Sides of 200 mm Walls - Sump | m2 | 9.0 | | |
| 4.10 | Sides of 200 mm Walls - Sludge collection channel | m2 | 52.0 | | |
| 4.11 | Surfaces of walls, width 0.1 m kicker | m2 | 43.0 | | |
| | (i) Vertical Formwork - Class F2 Finish | | | | |
| 4.12 | Sedimentation tank wall at expansion joints interface | m2 | 86.0 | | |
| | (iii) Vertical Formwork - Class F3 Finish | | | | |
| 4.13 | Sides of Walls - Sedimentation Tank, width 0.3 m | m2 | 570.0 | | |
| 4.14 | Sides of Walls - Scour chamber, width 0.2 m | m2 | 33.0 | | |
| 4.15 | Sides of Walls - Flocculated Water Channel, width 0.2 m | m2 | 59.0 | | |
| 4.16 | Sides of Walls -Inlet Water Channel, width 0.2 m | m2 | 55.0 | | |
| 4.17 | Sides of cantilever supports for headstock | m2 | 1.0 | | |
| 4.18 | Sides of tie beams depth n.e. 0.6m | m2 | 26.0 | | |
| | (iii) Horizontal Formwork - Class F3 Finish | | | | |

| | | | | | |
|---|---|----|------|--|--|
| 4.1 9 | Soffit of Floculated Water Channel, width 1.3m | m2 | 20.0 | | |
| 4.2 0 | Soffit of Inlet Water Channel, width 0.8m | m2 | 12.0 | | |
| 4.2 1 | Soffit of Walkways, width 0.9m - 1.3 m | m2 | 61.0 | | |
| 4.2 2 | Soffit of tie beams, width 0.45 m | m2 | 1.0 | | |
| | (v) Sloping Formwork - Class F3 Finish | | | | |
| 4.2 3 | Sloping side of cantilever support for headstock | m2 | 1.0 | | |
| | Other Formwork- Class F3 Finish | | | | |
| 4.2 4 | Box out for 400mm x 400mm square inlet control penstock in concrete walls and making good after installation of penstocks | Nr | 2.0 | | |
| | Form 200 mm dia. cylindrical openings, 200 mm high, in base slab of inlet channel of sedimentation tank | Nr | 15.0 | | |
| 4.2 6 | Box out for 400mm x 200mm collection trough in concrete walls and making good after installation of troughs | Nr | 3.0 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |
| 5 | <u>PRECAST CONCRETE SLABS</u> | | | | |
| | Precast concrete Class 25/20 finished fair on all surfaces and reinforced as shown on drawings. Provide and fix: | | | | |
| 5.1 | 75mm thick cover slabs size 1250mm long x 400mm wide including 2 Nr. mild steel key holes cast with slab constructed as per details on Drg. No. TWWDA/KTW/ST-03 | Nr | 11.0 | | |
| 6 | <u>CONCRETE SURFACE FINISH</u> | | | | |

| | | | | | |
|---|---|----|-------|--|--|
| 6.1 | Provide Class UF3 Finish for top of base slab of Sedimentation Tanks, Channels, Walkways, etc. | m2 | 96.0 | | |
| 6.2 | Provide all materials and finish surface of concrete with cement mortar 1:4 to required slope in sludge concentration pockets | m2 | 28.0 | | |
| 7 | <u>CONSTRUCTION JOINTS</u> | | | | |
| | Provide and install the following waterstops in construction joints including all surface treatment, formwork, forming of rebate 20 mm x 20 mm and sealing of rebate with polysulphide sealant all as per Drawings and Specification. | | | | |
| | 200 mm wide expandite super-cast waterfoil PVC or similar approved waterstop in vertical/horizontal construction joints in walls | m | 221.0 | | |
| 7.2 | Approved expansion board, thickness 25mm between sedimentation tank and settled water channel | m2 | 21.0 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |
| 8 | <u>METAL WORK</u> | | | | |
| | All steelwork to be completely cleaned by acid dipping prior to galvanising. | | | | |
| | Galvanised mild steel tubular balustrades all framed and welded together, including all necessary labours and fittings on tubings: | | | | |
| 8.1 | Provide and fix 900 mm high level balustrades of 40 mm diameter tubing Class B throughout, consisting of handrail and parallel middle rail 450 mm below the hand rail with balusters at maximum 1500 mm centres | m | 100.0 | | |

| | | | | | |
|----------|---|----|-----|--|--|
| 8.2 | Provide and fix GMS settled water collection troughs length 4,000 mm made out of 6mm thick GMS sheet as detailed on Drg. No. TWWDA/KTW/ST-01 Include 6 mm thick galvanised steel plate welded to end of trough | Nr | 3.0 | | |
| 8.3 | Provide and fix 254 mm x 146 mm x 31 kg/m GMS universal beams 7,000 mm long. Include for all materials, bolts, etc., drilling and fixing into concrete as detailed on Drg. No. TWWDA/KTW/ST-01 | Nr | 1.0 | | |
| 8.4 | Provide and fix GMS support clamps including for all materials and necessary drilling and fixing to GMS universal beams or bracket as required. | Nr | 6.0 | | |
| 8.5 | Provide and fix 100 mm x 100 mm x 8 kg/m angle bracket 700mm long fixed to beam by means of 2 Nr 12 mm rawl bolts 100 mm long, include for all drilling. | Nr | 3.0 | | |
| 8.6 | Provide and fix 750 mm x 450 mm x 6 mm thick M.S. Plate welded to collection trough and fixed to wall of Sedimentation Tank with 20 mm dia., 150 mm long rawl bolts. Include for packing and sealing of joint between plate and wall. | Nr | 6.0 | | |
| 8.7 | Provide all materials and fix GMS CAT ladder, length 4.5m to inside of chamber as per detail Drg. No TWWDA/KTW/ST-03 | Nr | 1.0 | | |
| 8.8 | Provide and fix lockable G.M.S Open Mesh Flooring to scour chamber 1400 mm x 1500 mm | Nr | 2.0 | | |
| 8.9 | Ditto but for- flocculated channel outlet 1250 mm x 2300 mm | Nr | 1.0 | | |
| 9 | <u>PAINTING AND DECORATING</u> | | | | |

| | | | | | |
|---|--|------|-------|--|--|
| | Provide, prepare and apply one coat mordant solution, one undercoat and two coats gloss enamel paint on galvanised metal work externally on: | | | | |
| 9.1 | Guardrail pipe and fittings including 900 mm high level balustrades | m | 65.0 | | |
| 9.2 | Decanting troughs | m2 | 37.0 | | |
| 9.3 | Exposed Pipework and fittings | Item | L.S | | |
| 9.4 | Provide and apply 3 coats of approved epoxy paint on one coat epoxy primer to internal concrete surfaces of Sedimentation Tanks (water line only) ('Masterseal 180' as made by BASF or approved equivalent). | m2 | 284.0 | | |
| 10 | <u>LEAK PROOF TESTING</u> | | | | |
| 10.1 | Allow for leakproof testing of all Sedimentation Tanks and flocculation water channel as specified | Item | L.S | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |
| 11 | <u>PIPEWORK, FITTINGS & VALVES</u> | | | | |
| | <u>Supply Transport to Site and Store in Secure Place</u> | | | | |
| | <u>including Jointing Material, Bolts Gaskets, Packing, Jointing Glues, etc. as Applicable</u> | | | | |
| 11.1 | 400mm x 400mm square opening penstock non-rising stem type with extended spindle & head stock | Nr | 2.0 | | |
| | <u>Scour Pipework - Approved Lined Ferrous Pipes to Class NP16</u> | | | | |
| 11.2 | 150mm dia. special single flanged 90° bend (Mark A) | Nr | 1.0 | | |

| | | | | | |
|-------|--|----|-----|--|--|
| 11.3 | 150mm dia. all flanged gate valve with extension spindle and wheel Euro 20 Series, type 23 or approved equivalent (Mark B) | Nr | 1.0 | | |
| 11.4 | 150mm dia. flanged spigot pipe, length 1200mm with puddle flange at 380 mm from spigot end (Mark C) | Nr | 1.0 | | |
| 11.5 | 150mm dia. Coupling (Mark D) | Nr | 2.0 | | |
| 11.6 | 150 mm dia. plain ended pipe length 4m with couplings (Mark E1) | Nr | 1.0 | | |
| 11.7 | Ditto- length 6m with couplings (Mark E2) | Nr | 1.0 | | |
| 11.8 | 150mm dia. plain ended pipe, length 1200mm with puddle flange at 155mm from one end (Mark F) | Nr | 1.0 | | |
| | <u>Transport From Site Store, Install, Test and Commission</u> | | | | |
| 11.9 | 400mm x 400mm square opening penstock non-rising stem type with extended spindle & head stock (Ham baker or approved equivalent) | Nr | 2.0 | | |
| | <u>Scour Pipework - Approved Lined Ferrous Pipes to Class NP16 as shown in Drg No. TWWDA/KTW/ST-03</u> | | | | |
| 11.10 | 150mm dia. single flanged 90° bend (Mark A) | Nr | 1.0 | | |
| 11.11 | 150mm dia. all flanged gate valve with extension spindle and wheel Euro 20 Series, type 23 or approved equivalent (Mark B) | Nr | 1.0 | | |
| 11.12 | 150mm dia. flanged spigot pipe, length 1200mm with puddle flange at 380 mm from spigot end (Mark C) | Nr | 1.0 | | |
| 11.13 | 150mm dia. Coupling (Mark D) | Nr | 2.0 | | |

| | | | | | |
|-----------|--|----|-----|--|--|
| 11. 14 | 150 mm dia. plain ended pipe length 4m with couplings (Mark E1) | Nr | 1.0 | | |
| 11. 15 | Ditto- length 6m with couplings (Mark E2) | Nr | 1.0 | | |
| 11. 16 | 150mm dia. plain ended pipe, length 1200mm with puddle flange at 155mm from one end (Mark F) | Nr | 1.0 | | |

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COLLECTION SHEET

SEDIMENTATION TANK

Collection 1

Collection 2

Collection 3

Collection 4

Collection 5

Collection 6

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BILL NO. 4

KAHARO TREATMENT WORKS - FILTERS, FILTER GALLERY

| IT EM No. | DESCRIPTION | UNIT | QTY | RATE Kshs | A M O U N T KS hs. |
|-----------------|-------------------|------|-----|------------------|---|
| 1 | <u>EXCAVATION</u> | | | | |

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| | The rates shall include for all strutting, shuttering, stabilising the excavation faces, and keeping the excavation free of water by pumping, bailing or other means. | | | | |
| | Bulk excavations and top soil stripping for all structures are measured under General Site Clearance | | | | |
| | Excavate below stripped level to formation level in common material, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by the Engineer. | | | | |
| 1.1 | Maximum depth n.e. 1.0 m | m3 | 110 | | |
| 1.2 | -Ditto- but maximum depth 1.0 m to 2.0 m | m3 | 45 | | |
| 1.3 | -Ditto- but maximum depth 2.0 m to 3.0 m | m3 | 1 | | |
| 1.4 | Transport approved excavated materials from site and use as fill and compact in 200mm layers as specified on site as and where directed by the Engineer. | m3 | 4.5 | | |
| 1.5 | Provide approved hardcore and compact in layers of 200mm, blinded with final material 25mm thick | m3 | 34 | | |
| 1.6 | Extra over Items 1.1 to 1.3 for excavation in rock Class 'A', blasting not permitted (Provisional) | m3 | 9.4 | | |
| 1.7 | -Ditto- for excavation in rock Class 'B', blasting not permitted (Provisional) | m3 | 15 | | |
| 1.8 | -Ditto- for excavation in rock Class 'C', blasting not permitted (Provisional) | m3 | 12 | | |
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| 2 | <u>CONCRETE WORKS</u> | | | | |
| | Provide, mix and place concrete as directed | | | | |

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| | Plain Concrete Class 15/20 in 75mm Blinding layer under | | | | |
| 2.1 | Base slab for filters | m2 | 60 | | |
| 2.2 | Base slab for filter gallery | m2 | 23 | | |
| 2.3 | Base slab- Back wash water channel | m2 | 11 | | |
| 2.4 | Mass Concrete Class 15/20 between filter water collection channel end wall and filter gallery wall | m3 | 7.5 | | |
| | Vibrated Reinforced Concrete class 25/20 in:- | | | | |
| 2.5 | Base slab - filter | m3 | 18 | | |
| 2.6 | Base slab - filter gallery | m3 | 7 | | |
| 2.7 | Wall - settled water channel / filter | m3 | 2.9 | | |
| 2.8 | Wall-settled water channel/sedimentation tank | m3 | 4.4 | | |
| 2.9 | Wall - filter / filter gallery | m3 | 12.3 | | |
| 2.10 | Side walls - filter | m3 | 36 | | |
| 2.11 | Base slab - settled water channel | m3 | 3 | | |
| 2.12 | Base slab - filter inlet channel | m3 | 1.1 | | |
| 2.13 | Wall - filter inlet channel | m3 | 2.5 | | |
| 2.14 | Cantilevered platforms for headstocks | m3 | 1 | | |
| 2.15 | Wall - filter water collecting channel | m3 | 3 | | |
| 2.16 | Walls - washwater overflow channel | m3 | 2.5 | | |
| 2.17 | Base - washwater channel | m3 | 4 | | |

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| 2.1 8 | Walls - washwater collection trough | m3 | 1.5 | | |
| 2.1 9 | Base - washwater collection trough | m3 | 2.5 | | |
| 2.2 0 | Wall - filtered water channel | m3 | 3.3 | | |
| 2.2 1 | Top slab - filtered water channel | m3 | 1.7 | | |
| 2.2 2 | External wall - filter gallery | m3 | 1.7 | | |
| 2.2 3 | Walkway slabs | m3 | 1 | | |
| 2.2 4 | Ring Beams - ground floor | m3 | 1.7 | | |
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| 3 | <u>REINFORCEMENT</u> | | | | |
| | Provide high tensile steel reinforcement to SRN 127 including cutting, propping, spacing and tying as specified | | | | |
| 3.1 | All diameters | Kg | 13332 | | |
| 4 | <u>FORMWORK</u> | | | | |
| | Provide and fix shuttering including propping, strutting and striking all as specified | | | | |
| | Vertical Formwork - Class F1 Finish | | | | |
| 4.1 | 300 mm side for base slab - filter | m | 21.1 | | |
| 4.2 | 300 mm side for base slab - filter gallery | m | 29 | | |
| | Vertical Formwork - Class F3 Finish | | | | |
| 4.3 | 300 mm side for base slab - filter collection channels | m | 27 | | |
| 4.4 | Walls-filter collection channels -(0.3m-0.425m) | m | 27 | | |
| 4.5 | Walls-filter collection channels (0.3m-0.8) | m | 27 | | |
| 4.6 | Walls-Wash water channels -(0.3m-0.4m) | m | 9 | | |

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| | Horizontal Formwork - Class F2 Finish | | | | |
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| 4.7 | Soffit of slab - inlet channel (0.6 m - 0.8 m) | m2 | 7 | | |
| | | | | | |
| 4.8 | Soffit of walkway slab (0.1 m - 0.3 m) | m2 | 4.2 | | |
| | | | | | |
| 4.9 | Soffit of slab-settled water channel (0.8m-1.0m) | m2 | 16 | | |
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| | Vertical Formwork - F2 Finish | | | | |
| 4.1 2 | Sides of walls - Filters/Filtered Water Channel, width 0.1 m | m | 64.4 | | |
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| 4.1 3 | Ring beams (0.3 m - 0.6m) | m2 | 9.5 | | |
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| | Vertical Formwork - F1 Finish | | | | |
| 4.1 4 | External walls-settled water channel (1.0 m - 2.0 m) | m2 | 26 | | |
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| | Vertical Formwork - F3 Finish | | | | |
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| 4.1 5 | Internal walls - settled water channel (1.0 m-2.0 m) | m2 | 22 | | |
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| | Vertical Formwork - F3 Finish | | | | |
| 4.1 6 | Wall - filter / filter gallery (4.5 m - 6.0 m) | m2 | 86 | | |
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| | Vertical Formwork - F3 Finish | | | | |
| 4.1 7 | Walls filter (3.4 m - 4.8 m) | m2 | 242 | | |
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| 4.1 8 | Wall - inlet channel (1.0 m - 1.5 m) | m2 | 25 | | |
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| 4.1 9 | Walls - filter collecting channel (0.5 m - 1.0 m) | m2 | 36 | | |
| | | | | | |
| 4.2 0 | Walls - filter gallery (1.5m-1.8m) | m2 | 5 | | |
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| 4.2 1 | 150 mm side - walkways | m | 19 | | |
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| | Sloping Formwork - F3 Finish | | | | |
| 4.2 2 | Cantilevered platforms for headstocks (0.1 m - 0.3 m) | m | 1 | | |
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| | Vertical Formwork - F3 Finish | | | | |
| 4.2 3 | Cantilevered platforms for headstocks (0.1 m - 0.3 m) | m | 1 | | |
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| | Horizontal Formwork - F3 Finish | | | | |
| 4.2 4 | Soffit of washwater collection trough (0.8 m - 1.0 m) | m2 | 12 | | |
| | | | | | |
| | Vertical Formwork - F3 Finish | | | | |
| 4.2 5 | Walls - washwater collection trough (0.4 m - 0.8 m) | m2 | 24 | | |
| | | | | | |
| 4.2 6 | Walls - filtered water channel (1.0 m - 1.5 m) | m2 | 44 | | |
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| | Horizontal Formwork - F2 Finish | | | | |
| 4.2 7 | Soffit of roof - filtered water channel (1.0 m - 1.5 m) | m2 | 11 | | |
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| 5 | <u>CONSTRUCTION JOINTS</u> | | | | |
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| | Provide and install the following waterstops in construction joints including all surface treatment, formwork, forming of rebate 20mm x 20mm and sealing of rebate with polysulphide sealant all as per Drawings and Specifications. | | | | |
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| 5.1 | 200 mm wide Expandite Supercast water foil PCV or similar approved waterstop in vertical /horizontal construction joints | m | 116 | | |
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| 5.2 | Approved expansion board, thickness 25mm between sedimentation tank wall and settled water channel. | m2 | 14 | | |
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| 6 | <u>OPENINGS</u> | | | | |
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| 6.1 | Form 200 mm diameter opening through 150 mm base by placing G.I. Pipe sleeve and removing after concreting for filter inlet channel | Nr | 4 | | |
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| 7 | <u>PROVIDE CLASS UF3 FINISH</u> | | | | |
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| 7.1 | Provide all materials and lay cement screed (1:4) to required falls as indicated (Avg. 50mm thick) in washwater channel | m2 | 8.9 | | |
| 7.2 | - Ditto - in filtered water channel | m2 | 11 | | |
| | Provide all materials and lay grano finish on cement screed in:- | | | | |
| 7.3 | Filter gallery | m2 | 17 | | |
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| 8 | <u>FILTER UNDER DRAINAGE SYSTEM</u> | | | | |
| | <u>Concrete Class 25/20 precast concrete:</u> | | | | |
| 8.1 | Provide all materials and fix with approved sealer, filter under drain slabs 1600 mm long (in 3 pieces) x 700 mm wide x 75 mm thick as detailed on Drg. No. TWWDA/KTW/FFG-07. Include for bolt holes and casting in 100 mm diameter pipe with puddle flange as detailed in the drawing. Include reinforcement and G.S. nipple as detailed. | Nr | 6 | | |
| 8.2 | Supply and fix 16 mm diameter G.S. bolts and nuts as detailed on Drg. No. TTWDA/KTW/FFG-07. | Nr | 28 | | |
| 8.3 | - Ditto - 100 mm diameter G.I. socketted tee with 12 mm diameter GMS nut welded on top and 12 mm diameter hole drilled. | Nr | 42 | | |
| 8.4 | - Ditto - 100 mm diameter uPVC Class 'E' pipe 1700 mm long lateral with 8 pairs of 10 mm diameter holes | Nr | 84 | | |
| 8.5 | - Ditto - 100 mm diameter uPVC end cap | Nr | 84 | | |
| 8.6 | - Ditto - 100 mm diameter uPVC faucet socket with G.I. male threaded on one end and PVC socket on the other end | Nr | 84 | | |
| 8.7 | - Ditto - 12 mm diameter brass nipple with anticlockwise and clockwise (B.S.F.) threads | Nr | 42 | | |

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| | Filter Media | | | | |
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| 8.8 | Provide gravel and form filters bed to the details shown on Drg. No. TWWDA/KTW/FFG-03 | m ² | 44 | | |
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| 8.9 | Provide sand and form filter sand bed to the details shown on Drg. No. TWWDA/KTW/FFG-03 | m ² | 44 | | |
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| | Support Brackets - Provide and Fix: | | | | |
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| 8.10 | Mass Concrete Class 20/20 finished fair on all surfaces support blocks 220 mm x 100 mm x 180 mm for brackets for uPVC laterals with half round groove for resting laterals as detailed on Drg. No. TWWDA/KTW/FFG-08. Include fixing with mortar. Include for top GMS support plate & bolts as detailed. | Nr | 126 | | |
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| 9 | <u>METAL WORK</u> | | | | |
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| | All steelwork to be completely cleaned by acid dipping prior to galvanising. | | | | |
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| 9.1 | Provide and fix 6 mm GMS deflector plate with 45° crank at 150 mm from one end fixed to concrete with 4 nr. 12 mm diameter rawl bolts as detailed on Drg. No. TWWDA/KTW/FFG-03. | Nr | 4 | | |
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| 9.2 | Provide and fix C.I. Medium duty inspection cover size 600 mm x 450 mm with frames on filtered water channel | Nr | 1 | | |
| | | | | | |
| 9.3 | Provide and fix 900 mm high level balustrades of 40 mm diameter tubing Class 'B' throughout consisting of handrail and parallel middle rail 450mm below the handrail with balusters at maximum 1500 mm centres, all as detailed | m | 35 | | |
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| 9.4 | Provide and fix balustrade unit 1000 mm high comprising 32 mm diameter galvanised pipe top,middle and bottom end bent, fanged and built into mortice in concrete. | m | 30 | | |
| 10 | <u>MISCELLANEOUS</u> | | | | |
| 10.1 | Boxing out 1000 mm x 450 mm holes in Filter Gallery concrete wall for wash water Channel exit to wash water Chamber and making good after construction of the Channel. | Nr | 1 | | |
| 10.2 | - Ditto - but 600 mm x 550 mm holes on filter/overflow wash water reinforced concrete wall for wash water trough. | Nr | 4 | | |
| 10.3 | - Ditto - but 450 mm x 250 mm holes | Nr | 6 | | |
| 10.4 | - Ditto - but 250 mm x 250 mm holes in settled/filter inlet channel wall for inlet penstock | Nr | 4 | | |
| 10.5 | Boxing out 350 mm dia. holes in the side walls of the filter gallery for wash water inlet pipe and making good after pipe laid | Nr | 1 | | |
| 10.6 | - Ditto - but 300 mm dia. holes for filtered water pipes and backwash water pipes | Nr | 12 | | |
| 10.7 | - Ditto - but 200mm dia. holes in filtered water channel for filtered water outlet pipes | Nr | 4 | | |
| 10.8 | - Ditto - but 350mm dia. Holes in filtered water channel wall for filtered water outlet to the tank | Nr | 1 | | |
| 10.10 | Ditto -but for 100mm dia holes for Air Wash Pipe | Nr | 5 | | |
| 10.11 | - Ditto - but 600 mm x 450 mm holes for inspection chambers on the roof slab of filteres water channel | Nr | 2 | | |

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| 10.12 | Allow for cutting, grouting and making good any holes, chases etc. for all fittings and pipework fixing and electrical work in the filters, filter gallery and filter control room | Item | L.S | | |
| 10.13 | Provide all materials and fix to concrete air pipe supports as per details on Drg No. TWWDA/KTW/FFG-07 include for 3 coats of paint | Nr | 4 | | |
| 10.14 | Allow for leak proof testing of all the filters as specified | Item | L.S | | |
| 10.15 | Provide, prepare and apply one coat mordant solution, one undercoat and two coats gloss enamel paint on galvanised metalwork externally on handrail pipe and fittings in 900 mm high level balustrade. | m | 70 | | |
| 10.16 | Ditto-but for a 1000mm high raking balustrade | m | 10 | | |
| 10.17 | Provide concrete support for washwater outlet and overflow measuring 775mm x 400mm x 300mm high with bituminous felt padding and 80mm x 6mm hick flat flat Gms plate anchored to the support by 2 nr. 6mm diameter bolts as per detail on Drg. No. TWWDA/KTW/FFG-05 | Nr | 2 | | |
| 10.18 | Provide mass concrete class 15/20 thrust blocks under 200mm dia. gate valves as per details on Drg. No. TWWDA/KTW/FFG-04 | Nr | 2 | | |
| 10.19 | -Ditto - but for 300mm dia. gate valve as per details on Drg. No. TWWDA/KTW/FFG-05 | Nr | 2 | | |
| 10.20 | -Ditto but under 200mm dia. gate valves as per details on Drg. No. TWWDA/KTW/FFG-04 | Nr | 2 | | |
| 10.21 | Allow for painting of all filtered water pipework to approved standards with 3 coats of super gloss paint applied on one coat primer. Colour selection to be approved by the Engineer. | Item | L.S | | |

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| 10. 22 | Ditto- but for washwater inlet and washwater outlet pipework, Air wash pipework and overflow pipework. | Item | L.S | | |
| 10. 25 | Provide & fix over settled water channel precast concrete walkway slabs 950mm x 400mm x 75mm thick with 2No. mild steel key holes as per details on Drg. No. TWWDA/KTW/FFG-03 | Nr | 19 | | |
| 10. 26 | Provide all materials (including tile adhesive, etc) and fix white ceramic tiles in filtered water channel as shown on Drg. No. TWWDA/KTW/FFG-08 | m ² | 30 | | |
| 10. 27 | Provide and apply Epoxy wall and floor coating, 'MASTERTOP 1110T' or approved equivalent, on internal surfaces of filter walls and floor. | m ² | 201 | | |
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| 11 | <u>PIPEWORK, FITTINGS & VALVES</u> | | | | |
| | <u>Supply, transport to site and store in secure place, including jointing material, bolts, gaskets, packing, jointing glues, etc. as applicable</u> | | | | |
| | Note: Dimensions of Pipes and Fittings to be as shown on Drgs. Nos.TWWDA/KTW/FFG-10 | | | | |
| | <u>Filter inlet</u> | | | | |
| 11. 1 | 250 mm C.I. square Inlet Control penstock non-rising stem type complete with extension spindle and headstock with handwheel HamBaker or approved equivalent. | Nr | 2 | | |
| | <u>Air Main Pipework - Approved lined ferrous pipes</u> | | | | |
| 11. 2 | 100mm dia. flanged spigot pipe 4105mm long with spigot end blanked off and 21Nr. 12mm dia. holes and hexagon nuts welded at 215mm and 310mm c/c on underside as per details (Mark a) | Nr | 2 | | |

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| 11.3 | 100mm dia. all flanged special tee with 2Nr. 12mm dia. holes and hexagon nuts welded at 215mm c/c on underside (Mark b) | Nr | 2 | | |
| 11.4 | 100mm dia. flanged spigot pipe 205mm long with spigot end blanked off and 1Nr. 12mm dia. hole and hexagon nut welded at 90mm from spigot end as per details (Mark c) | Nr | 2 | | |
| 11.5 | 100 mm dia. all flanged pipe, 2950 mm long (Mark d) | Nr | 2 | | |
| 11.6 | 100 mm dia. all flanged 90° bend (Mark e) | Nr | 6 | | |
| 11.7 | 100 mm dia. flanged spigot pipe, 1757 mm long (Mark f) | Nr | 2 | | |
| 11.8 | 100 mm dia. flange adaptor (Mark g) | Nr | 2 | | |
| 11.9 | 100 mm dia. all flanged gate valve with extended non-rising spindle length 410mm and headstock with handwheel to SRN 501 (Mark h) | Nr | 2 | | |
| 11.10 | 100mm x 100mm dia. all flanged tee (Mark i) | Nr | 2 | | |
| 11.11 | 100mm dia. all flanged pipe, 3160mm long (Mark j) | Nr | 2 | | |
| 11.12 | 100mm dia. blank flange (Mark k) | Nr | 2 | | |
| 11.13 | 100mm dia. all flanged pipe, 1774mm long (Mark l) | Nr | 2 | | |
| 11.14 | 100mm dia. flanged spigot pipe 4000mm long (cut to suit on site) (Mark m) | Nr | 2 | | |
| 11.15 | 100mm dia. flange adaptor (Mark n) | Nr | 2 | | |
| 11.16 | 100mm dia. flanged spigot pipe 1200mm long (Mark o) | Nr | 2 | | |
| 11.17 | 100mm dia. Flanged non-return valve (Mark p) | Nr | 2 | | |

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| 11.18 | 150mm x 100mm double flanged concentric taper (Mark q) | Nr | 2 | | |
| 11.19 | 150mm dia. flanged spigot pipe 1200mm long (Mark r) | Nr | 2 | | |
| | <u>Filtered Water Outlet Pipework - Approved Lined Ferrous Pipes</u> | | | | |
| 11.20 | 300mm dia. special flanged bellmouth 500mm long with puddle flange at 100mm from bellmouth end (Mark 1) | Nr | 2 | | |
| 11.19 | 300mm dia. all flanged pipe, 1520mm long with puddle flange at 500mm from one end (Mark 2) | Nr | 2 | | |
| 11.20 | Special all flanged cross 300mm x 300mm x 300mm x 300mm (Mark 3) | Nr | 2 | | |
| 11.21 | 300mm x 200mm dia. all flanged concentric taper (Mark 4) | Nr | 4 | | |
| 11.22 | 200mm dia. all flanged gate valve with extension spindle, length 4.8m and headstock with handwheel to SRN 501 (Mark 5) | Nr | 2 | | |
| 11.23 | 200mm dia. flanged spigot 90° bend (Mark 6) | Nr | 2 | | |
| 11.24 | 200mm dia. all flanged gate valve, with extension spindle, length 4.8m and headstock with handwheel to SRN 501 (Mark 7) | Nr | 2 | | |
| 11.25 | 200mm dia. flange adaptor (Mark 8) | Nr | 2 | | |
| 11.26 | 200mm dia. plain ended pipe 475mm long with puddle flange at 75mm from one end (Mark 9) | Nr | 2 | | |
| | <u>Washwater Inlet - Approved Lined Ferrous Pipes</u> | | | | |

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| 11. 27 | 300mm dia. all flanged gate valve with extension spindle, length 4.8m and headstock with handwheel to SRN 501 (Mark 10) | Nr | 2 | | |
| 11. 28 | 300mm dia. all flanged 900 short radius special bend (Mark 11) | Nr | 4 | | |
| 11. 29 | 300mm dia. all flanged pipe 2000mm long (Mark 12) | Nr | 2 | | |
| 11. 30 | 350mm x 350mm x 300mm dia. all flanged tee (Mark 13) | Nr | 2 | | |
| 11. 31 | 350mm dia. blank flange (Mark 14) | Nr | 1 | | |
| 11. 32 | 350mm dia. all flanged pipe 2850mm long (Mark 15) | Nr | 2 | | |
| 11. 33 | 350mm dia. all flanged pipe 3950mm long (Mark 16) | Nr | 1 | | |
| 11. 34 | 350mm dia. all flanged 90° short radius bend (Mark 17) | Nr | 1 | | |
| 11. 35 | 350mm dia. flanged spigot pipe 2000mm long (Length cut to suit on site) (Mark 17A) | Nr | 1 | | |
| 11. 36 | 350mm dia. flange adaptor (Mark 17B) | Nr | 1 | | |
| 11. 37 | 350mm dia. flanged spigot pipe 1200mm long (Mark 17C) | Nr | 1 | | |
| 11. 38 | 350mm dia. coupling (Mark 17D) | Nr | 1 | | |
| | <u>Washwater Outlet - Approved Lined Ferrous Pipes</u> | | | | |
| 11. 39 | 300mm dia. flanged spigot pipe 525mm long with puddle flange at 150mm from spigot end (Mark 18) | Nr | 2 | | |
| 11. 40 | 300mm dia. all flanged 90° short radius special bend (Mark 19) | Nr | 2 | | |

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| 11.41 | 300mm dia. all flanged gate valve with extended non-rising spindle, length 4.0m and non-rising type headstock with handwheel to SRN 501 (Mark 20) | Nr | 2 | | |
| 11.42 | 300mm dia. special flanged spigot 900 short radius bend (Mark 21) | Nr | 2 | | |
| | <u>Overflow Pipework - Approved Lined Ferrous Pipes</u> | | | | |
| 11.43 | 200mm dia. flanged spigot pipe 470mm long with puddle flange at 150mm from spigot end (Mark 22) | Nr | 2 | | |
| 11.44 | 200mm dia. all flanged 90° bend (Mark 23) | Nr | 2 | | |
| 11.45 | 200mm dia. flanged spigot pipe, 3675mm long (Mark 24) | Nr | 2 | | |
| | <u>Filtered Water Outlet to Treated Water Tank Pipework</u> | | | | |
| 11.46 | 350mm dia flanged spigot pipe 15000mm long with puddle flange at 100 mm from the spigot end;600mm long (mark 25) | Nr | 1 | | |
| 11.47 | 350mm dia coupling (Mark 26) | Nr | 1 | | |
| | <u>Transport From Site Store, Install, Test & Commission</u> | | | | |
| | <u>Filter inlet</u> | | | | |
| 11.48 | 250 mm C.I. square Inlet Control penstock non-rising stem type complete with extension spindle and headstock with handwheel HamBaker or approved equivalent. | Nr | 2 | | |
| | <u>Air Main Pipework - Approved lined ferrous pipes</u> | | | | |

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| 11.49 | 100mm dia. flanged spigot pipe 4105mm long with spigot end blanked off and 21Nr. 12mm dia. holes and hexagon nuts welded at 215mm and 310mm c/c on underside as per details (Mark a) | Nr | 2 | | |
| 11.50 | 100mm dia. all flanged special tee with 2Nr. 12mm dia. holes and hexagon nuts welded at 215mm c/c on underside (Mark b) | Nr | 2 | | |
| 11.51 | 100mm dia. flanged spigot pipe 205mm long with spigot end blanked off and 1Nr. 12mm dia. hole and hexagon nut welded at 90mm from spigot end as per details (Mark c) | Nr | 2 | | |
| 11.52 | 100 mm dia. all flanged pipe, 2950 mm long (Mark d) | Nr | 2 | | |
| 11.53 | 100 mm dia. all flanged 90° bend (Mark e) | Nr | 3 | | |
| 11.54 | 100 mm dia. flanged spigot pipe, 1757 mm long (Mark f) | Nr | 2 | | |
| 11.55 | 100 mm dia. flange adaptor (Mark g) | Nr | 2 | | |
| 11.56 | 100 mm dia. all flanged gate valve with extended non-rising spindle length 410mm and headstock with handwheel to SRN 501 (Mark h) | Nr | 2 | | |
| 11.57 | 100mm x 100mm dia. all flanged tee (Mark i) | Nr | 2 | | |
| 11.58 | 100mm dia. all flanged pipe, 3160mm long (Mark j) | Nr | 2 | | |
| 11.59 | 100mm dia. blank flange (Mark k) | Nr | 1 | | |
| 11.60 | 100mm dia. all flanged pipe, 2685mm long (Mark l) | Nr | 1 | | |
| 11.61 | 100mm dia. flanged spigot pipe 4000mm long (cut to suit on site) (Mark m) | Nr | 1 | | |
| 11.62 | 100mm dia. flange adaptor (Mark n) | Nr | 1 | | |

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| 11. 63 | 100mm dia. flanged spigot pipe 1200mm long (Mark o) | Nr | 1 | | |
| 11. 64 | 100mm dia. Flanged non-return valve (Mark p) | Nr | 1 | | |
| | 150mm x 100mm flanged concentric taper (Mark q) | Nr | 1 | | |
| | 150mm dia. flanged spigot pipe 1200mm long (Mark r) | Nr | 1 | | |
| | <u>Filtered Water Outlet Pipework - Approved Lined Ferrous Pipes</u> | | | | |
| 11. 65 | 300mm dia. special flanged bellmouth 500mm long with puddle flange at 100mm from bellmouth end (Mark 1) | Nr | 2 | | |
| 11. 66 | 300mm dia. all flanged pipe, 1520mm long with puddle flange at 500mm from one end (Mark 2) | Nr | 2 | | |
| 11. 67 | Special all flanged cross 300mm x 300mm x 300mm x 300mm (Mark 3) | Nr | 2 | | |
| 11. 68 | 300mm x 200mm dia. all flanged concentric taper (Mark 4) | Nr | 4 | | |
| 11. 69 | 200mm dia. all flanged gate valve with extension spindle, length 4.8m and headstock with handwheel to SRN 501 (Mark 5) | Nr | 2 | | |
| 11. 70 | 200mm dia. flanged spigot 90° bend (Mark 6) | Nr | 2 | | |
| 11. 71 | 200mm dia. all flanged butterfly valve, with extension spindle, length 4.8m and headstock with handwheel to SRN 501 (Mark 7) | Nr | 2 | | |
| 11. 72 | 200mm dia. flange adaptor (Mark 8) | Nr | 2 | | |
| 11. 73 | 200mm dia. plain ended pipe 475mm long with puddle flange at 75mm from one end (Mark 9) | Nr | 2 | | |

| | Washwater Inlet - Approved Lined Ferrous Pipes | | | | |
|-------|---|----|---|--|--|
| 11.74 | 300mm dia. all flanged gate valve with extension spindle, length 4.8m and Headstock with handwheel to SRN 501 (Mark 10) | Nr | 2 | | |
| 11.75 | 300mm dia. all flanged 90° short radius special bend (Mark 11) | Nr | 4 | | |
| 11.76 | 300mm dia. all flanged pipe 2000mm long (Mark 12) | Nr | 2 | | |
| 11.77 | 350mm x 350mm x 300mm dia. all flanged tee (Mark 13) | Nr | 2 | | |
| 11.78 | 350mm dia. Blank flange (Mark 14) | Nr | 1 | | |
| 11.79 | 350mm dia. all flanged pipe 2850mm long (Mark 15) | Nr | 2 | | |
| 11.80 | 350mm dia. all flanged pipe 3950mm long (Mark 16) | Nr | 1 | | |
| 11.81 | 350mm dia. all flanged 90° short radius bend (Mark 17) | Nr | 1 | | |
| 11.82 | 350mm dia. flanged spigot pipe 2000mm long (Length cut to suit on site) (Mark 17A) | Nr | 1 | | |
| 11.83 | 350mm dia. flange adaptor (Mark 17B) | Nr | 1 | | |
| 11.84 | 350mm dia. flanged spigot pipe 1200mm long (Mark 17C) | Nr | 1 | | |
| 11.85 | 350mm dia. coupling (Mark 17D) | Nr | 1 | | |
| | Washwater Outlet - Approved Lined Ferrous Pipes | | | | |
| 11.86 | 300 mm dia. flanged spigot pipe, 525 mm long with puddle flange at 150mm from spigot end (Mark 18) | Nr | 2 | | |

| | | | | | |
|---|--|----|---|--|--|
| 11. 87 | 300 mm dia. all flanged 90o short radius special bend (Mark 19) | Nr | 2 | | |
| 11. 88 | 300mm dia.all flanged gate valve with extended non-rising spindle, length 4.0m and non-rising type headstock with hand wheel to SRN 501(Mark 20) | Nr | 2 | | |
| 11. 89 | 300 mm dia. special flanged spigot 90° short radius bend (Mark 21) | Nr | 2 | | |
| | Overflow Pipework - Approved Lined Ferrous Pipes | | | | |
| 11. 90 | 200mm dia. flanged spigot pipe 470mm long with puddle flange at 150mm from spigot end (Mark 22) | Nr | 2 | | |
| 11. 91 | 200mm dia. all flanged 900 bend (Mark 23) | Nr | 2 | | |
| 11. 92 | 200mm dia. flanged spigot pipe, 3675mm long (Mark 24) | Nr | 2 | | |
| | <u>Filtered Water Outlet to Treated Water Tank Pipework</u> | | | | |
| 11. 93 | 350mm dia flanged spigot pipe 470mm long with puddle flange at 150 mm from the spigot end;600mm long (mark 25) | Nr | 1 | | |
| 11. 94 | 350mm dia coupling (Mark 26) | Nr | 1 | | |
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| <u>COLLECTION SHEET</u> | | | | | |
| FILTERS AND FILTER GALLERY | | | | | |
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| BILL No. 5 | | | | | |
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| ITEM | DESCRIPTION | UNIT | QUANTITY | RATE | A M O U N T (K s h s) |
| No. | | | | (Kshs) | |
| | | | | | |
| | | | | | |
| | CLASS D - SITE CLEARANCE | | | | |
| D11 | General clearance of all shrubs. | ha | 0.03 | | |
| | | | | | |
| | CLASS E - EARTHWORKS. | | | | |
| | | | | | |
| | General | | | | |
| | Excavation for Foundations | | | | |
| | Excavation for structures: material other than top soil, rock or artificial hard material for attaining the proposed sub grade, haul up to stockpiles on designated area to be determined by the Department. | | | | |
| | | | | | |
| E411 | Excavation for structures; depth not exceeding 0.25m. | m ³ | 19.70 | | |

| | | | | | |
|---|---|----------------|-------|--|--|
| E422 | General Excavation ;depth 0.25 - 0.5m. | m ³ | 19.70 | | |
| E423 | General Excavation ;depth 0.5 - 1m. | m ³ | 39.25 | | |
| E424 | General Excavation ;depth 1 - 2m. | m ³ | 78.5 | | |
| E425 | General Excavation ;depth exceeding 2m | m ³ | 78.5 | | |
| | <u>Filling</u> | | | | |
| E614 | Filling to structure using suitable excavated materials | m ³ | 11.78 | | |
| E615 | Filling to structure using suitable imported materials from borrow pit. -Hardcore fill. | m ³ | 23.55 | | |
| E645 | 50 mm Blinding layer using quarry dust. | m ³ | 4.00 | | |
| | <u>Filling Ancillaries</u> | | | | |
| E722 | Preparation of filled surfaces to receive permanent work. | m ² | 78.5 | | |
| | <u>CLASS F - INSITU CONCRETE</u> | | | | |
| | <u>Provision of concrete - designed concrete</u> | | | | |
| F233 | Concrete Class C15/20 to 100mm thick blinding layer. | m ³ | 3.70 | | |
| F253 | Concrete Class C25/20 to ground slab | m ³ | 26.00 | | |
| F253 | Concrete Class C25/20 to cover slab | m ³ | 10.40 | | |
| F253 | Concrete Class C25/20 to central column | m ³ | 0.30 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |
| | <u>CONCRETE ANCILLARIES</u> | | | | |
| | <u>Placing of concrete</u> | | | | |
| F651 | Blinding concrete not exceeding 150mm thick. | m ³ | 3.70 | | |
| F622 | Reinforced concrete to ground slab | m ³ | 26.00 | | |
| | | | | | |

| | | | | | |
|--------|--|----------------|----------|--|--|
| F632 | Reinforced concrete to cover slab. | m ³ | 10.40 | | |
| F632.3 | Reinforced concrete to central column | m ³ | 0.30 | | |
| | <u>FORWORK</u> | | | | |
| G245.1 | Fair finish sides of ground slab - 200 mm deep. | m ² | 25.40 | | |
| G245.2 | Fair finish sides of cover slab - 200 mm deep. | m ² | 10.90 | | |
| G215 | Fair finish soffit of cover slab. | m ² | 72.50 | | |
| G243 | Fair finish to central column | m ² | 3.50 | | |
| | - | | | | |
| | <u>REINFORCEMENT</u> | | | | |
| G523 | Nominal diameter 8mm | kg | 346.00 | | |
| G524.1 | Nominal diameter 12mm | kg | 3,080.00 | | |
| G525.2 | Nominal diameter 16mm | kg | 2,108.00 | | |
| | | | | | |
| | <u>Concrete Accessories</u> | | | | |
| G812.1 | Steel trowel Finishing to top surface of base slab | m ² | 72.30 | | |
| G812.2 | Steel trowel finish to soffit and top of cover slab. | m ² | 72.30 | | |
| | | | | | |
| | <u>BRICKWORK, BLOCKWORK AND MASONRY</u> | | | | |
| | Concrete masonry units bedded in mortar flush pointed including reinforcement using Y8 reinforcement bars for every alternate course. | | | | |
| U521 | 150 - 250mm mm thick solid blockwork | m ² | 58.50 | | |
| U531 | 250 - 500mm mm thick solid blockwork | m ² | 35.10 | | |
| | | | | | |
| | <u>JOINT</u> | | | | |
| V754 | Provide and apply 20x20mm bondex filler at the tank bottom joint | m | 29.30 | | |
| V857 | Provide and apply Bituminous paint on the slab -stone joints at the floor and roof slabs. | m ² | 17.60 | | |

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|---|---|----------------|--|-------|---|
| | CLASS Z: FINISHES | | | | |
| Z413.1 | 30mm thick two coat sulphate resisting plaster to all internal surfaces including water proofing additives | m ² | | 86.00 | |
| Z413.2 | 20mm thick one coat sulphate resisting plaster to all external surfaces including water proofing additives | m ² | | 93.50 | |
| Z413.3 | 50mm thick screed three coat sulphate resisting screed to floor surfaces including water proofing additives | m ² | | 57.40 | |
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| | CHAMBERS | | | | |
| K | CLASS K: PIPE WORK - CHAMBERS AND PIPE WORK ANCILLARIES | | | | |
| | Chambers, ducts, culverts, crossings, thrust and anchor blocks, reinstatement and others as listed and specified in drawings. | | | | |
| | Note:- Items for work in this class shall include:- - Excavation, preparation of surfaces, disposal of excavated material, shoring sides of excavation, backfilling and removal of redundant services. - Concrete, reinforcement, formwork, joints and finishes. - Tips for disposal of excavated material or debris to be identified by the Contractor in liaison with the Local Authority. | | | | |
| K1 | Excavate for, provide all materials and construct complete chambers with lockable covers. Internal dimensions 1000mm x 1000 mm. Base slab to be 125 mm thick reinforced concrete and including cover slab of reinforced concrete. Rate to include for all thrust blocks, pipe supports, inspection covers etc as detailed in the drawings. Provide and place mass concrete grade 15 at outfalls to washouts including for all shuttering required as directed by the Resident Engineer. | | | | |

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| | | | | | |
| K111.3 | Inlet,outlet and washout chambers | nr | 3.00 | | |
| | | | | | |
| | CLASS J: PIPEWORK - FITTINGS AND VALVES | | | | |
| | | | | | |
| | Provide, handle, install and test the following steel and uPVC pipes and fittings, valves and specials. Rates shall include for completing all pipe joints as specified. | | | | |
| | | | | | |
| | Inlet Steel Pipes and Steel Fittings | | | | |
| | | | | | |
| J352.1 | 250mm HDPE /GI Adaptor | nr | 1.00 | | |
| | | | | | |
| J381.1 | 250mm x 1000mm long single flanged Pipe | nr | 2.00 | | |
| | | | | | |
| J811 | 250mm Flanged Gate Valve | nr | 1.00 | | |
| | | | | | |
| J352.2 | 250mm Flanged Adaptor | nr | 4.00 | | |
| | | | | | |
| J352.3 | 350mm Flanged Adaptor | nr | 4.00 | | |
| | | | | | |
| J311.1 | 250mm x 90° Double Flanged Bend | nr | 2.00 | | |
| | | | | | |
| J832 | 250mm Double flanged beat equilibrium float valve | nr | 1.00 | | |
| | | | | | |
| J371 | 1000mm Flanged Bell mouth | nr | 1.00 | | |
| | | | | | |
| J371.1 | 350mm Flanged Bell mouth | nr | 1.00 | | |
| | | | | | |
| J311.2 | 350mm x 90° Double Flanged Bend short radius bend | nr | 1.00 | | |
| | | | | | |
| J311.3 | 100mm x 90° Double Flanged Bend short radius bend | nr | 1.00 | | |
| | | | | | |

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|--------|---|----|------|--|--|
| J381.2 | 350mm x 2100mm long Single flanged pipe with puddle flange 500mm away from the flanged end. | nr | 1.00 | | |
| J323 | 350mm x 225mm all flanged TEE | nr | 1.00 | | |
| J352.4 | 350mm Blind Flange | nr | 1.00 | | |
| J352.5 | 250mm Blind Flange | nr | 1.00 | | |
| J332 | 250mm x 225mm Double Flanged Concentric taper | nr | 1.00 | | |
| J352.6 | 250mm Flanged Gate Valve | nr | 1.00 | | |
| J381.3 | 100mm x 1000mm long single flanged steel spigot pipe. | nr | 1.00 | | |
| | Overflow and Scour Steel Pipe and Fittings | | | | |
| J381.4 | 150mm x 600mm long Single Flanged pipe with central puddle | nr | 2.00 | | |
| J311.4 | 150mm x 90° Double Flanged short radius bend | nr | 1.00 | | |
| J351.1 | 150mm Flange Adaptor | nr | 1.00 | | |
| J381.5 | 150mm x 2500mm long Single flanged pipe. | nr | 1.00 | | |
| J311.5 | 150mm x 45° Double Flanged short radius bend | nr | 1.00 | | |
| J381.6 | 150mm x 1500mm long Single flanged pipe with bevelled end | nr | 1.00 | | |
| J381.7 | 150mm x 2100mm long Single flanged pipe with puddle flange 450mm from plain end. | nr | 1.00 | | |
| J811.1 | 150mm Double Flanged Gate Valve | nr | 1.00 | | |
| J811.2 | 225mm Double Flanged Gate Valve | nr | 1.00 | | |

| | | | | | |
|---|--|----|-------|--|--|
| J351.2 | 150mm HDPE/ GI adaptor | nr | 1.00 | | |
| J381.8 | 225mm x 1000mm long single flanged Pipe | nr | 1.00 | | |
| J381.9 | 100mm x 1000mm long single flanged Pipe | nr | 1.00 | | |
| J352.7 | 225mm HDPE/ GI adaptor | nr | 1.00 | | |
| I512 | 150mm Class C Upvc pipe | m | 6.00 | | |
| | Vent Pipe | | | | |
| J361 | Provide and fix 100mm vent pipes with gooze wire at the end. | nr | 2.00 | | |
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| | CLASS N: MISLENEOUS METAL WORK | | | | |
| | Rate to include supply and fixing and inclusive of foundations where applicable. | | | | |
| N13.1 | Galvanised mild steel internal ladders with stringers returned to form handrails.Length as shown in the drawings. | nr | 1.00 | | |
| N13.1 | Galvanised mild steel external ladders with stringers returned to form handrail.Length as shown in the drawings. | nr | 1.00 | | |
| | CLASS X:MISCELLANEOUS WORK | | | | |
| X136 | Provide all materials and construct concrete post and Chainlink fence as shown in the drawings. Height : 2.50 - 3.00 m | m | 76.00 | | |
| X234 | Provide and install metal gate, width:3 m. | nr | 1.00 | | |
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| <u>COLLECTION PAGE</u> | | | | | |

| 500M3 CLEAR WATER TANK | | | | | |
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| <u>BILL No. 6</u> | | | | | |
| - | | | | | |
| <u>KAHARO - PUMP HOUSE</u> | | | | | |
| - | | | | | |
| ITEM No. | DESCRIPTION | UNIT | QTY | RATE (Kshs) | AMOUNT (Kshs) |
| | <u>SUB-STRUCTURE</u> | | | | |
| 1 | <u>EXCAVATION</u> | | | | |
| | The rates shall include for all strutting, shuttering, stabilising the excavation faces, and keeping the excavation free of water by pumping, bailing or other means. | | | | |
| | Bulk excavations and top soil stripping for all structures are measured under General Site Clearance. | | | | |
| | Excavate below stripped level to formation level in common material, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by the Engineer. | | | | |
| 1.1 | Maximum depth n.e. 1.0 m | m3 | 110 | | |
| 1.2 | -Ditto- but maximum depth 1.0 m to 2.0 m | m3 | 60 | | |
| 1.3 | -Ditto- but maximum depth 2.0 m to 3.0 m | m3 | 2 | | |
| | <u>Extra Over Excavation in Any Position for:-</u> | | | | |

| | | | | | |
|------|--|----|----|--|--|
| 1.4 | Excavating in rock Class "A" | m3 | 11 | | |
| 1.5 | Excavating in rock Class "B" | m3 | 1 | | |
| 1.6 | Excavating in rock Class "C" | m3 | 1 | | |
| | <u>Approved Selected Filling as Described:-</u> | | | | |
| 1.7 | Provide and deposit approved selected fill in maximum 150mm thick layers in making up levels including achieving satisfactory compaction. Rate to include performing necessary compaction tests. | m3 | 20 | | |
| 1.8 | Provide, lay and level out fine crushed stone, sand or gravel blinding 50mm thick to surface of filling, including watering and rolling to achieve satisfactory compaction. | m2 | 54 | | |
| 1.9 | Fill with approved hardcore in a 300mm thick layer including achieving satisfactory compaction. | m2 | 54 | | |
| | <u>Disposal of Surplus Spoil:-</u> | | | | |
| 1.10 | Cart away surplus excavated materials to an approved dumping site | m3 | 20 | | |
| | <u>Anti-Termite Treatment</u> | | | | |
| 1.11 | Chemical anti-termite treatment to surface of filling with an approved insecticide. | m2 | 15 | | |
| | <u>Damp-Proof Membrane</u> | | | | |
| 1.12 | 500 Gauge polythene sheeting, laid over hardcore in two layers | m2 | 15 | | |
| | <u>CONCRETE WORK</u> | | | | |
| | Mass Concrete Class 15/20mm Maximum Aggregate as Described in:- | | | | |
| 1.13 | 75mm Thick blinding under the walls strip footings, column bases and over hardcore | m2 | 10 | | |
| | Guaranteed Strength Reinforced Concrete Class 25/20mm Maximum Aggregate as Described in:- | | | | |
| 1.14 | 300mm Thick Base Slab | m3 | 5 | | |
| 1.15 | 150mm Thick Base Slab | m3 | 5 | | |

| | | | | | |
|-------|---|----|----|--|--|
| 1.16 | 300mm Thick Column Bases and Wall Strip Footings | m3 | 2 | | |
| 1.17 | Isolated columns and piers in foundations | m3 | 1 | | |
| 1.18 | Pump Plinth size 1500mm long x 650mm wide x 300mm deep | Nr | 2 | | |
| | Builders Work | | | | |
| 1.19 | Drainage sump internal size 400mm long x400mm wide x 1000mm deep made out of 150mm thick reinforced concrete base and walls including forming rebate 50mm wide x 75mm deep to top inner edges of sump wall to receive chequer plate cover (m.s.) and including all necessary excavation, disposal and formwork. | Nr | 1 | | |
| 1.2 | Form cable duct internal size 200mm wide x 150mm deep in concrete floor slab including forming rebate 50mm wide x 75mm deep to top inner edges of channel wall to receive chequer plate cover (m.s.) | m | 14 | | |
| 1.21 | Form drainage channel internal size 150mm wide and depth varying from 150mm to 200mm deep in concrete floor slab including forming rebate 50mm wide x 75mm deep to top inner edges of channel wall to receive mild steel grating cover (m.s.) | m | 6 | | |
| 1.22 | Provide all materials and install a 100mm Dia. Upvc drainage pipe cast into floor slab | m | 3 | | |
| 1.243 | Form pocket internal size 1500mm long x 650mm wide x 300mm deep in base slab to receive pump plinth (R.C.) including all the necessary formwork | Nr | 2 | | |
| | Guaranteed Strength Reinforced Concrete Class 25/20mm Maximum Aggregate as Described in:- | | | | |
| 1.24 | 100mm Thick ramp laid to slope not exceeding 15 degrees from horizontal | m3 | 1 | | |
| 1.25 | Extra over for tamping concrete whilst still green to make ribbed finish of the ramp area. | m2 | 5 | | |
| | <u>Fabric Reinforcement No. A142 Mesh Size 150 x 150mm Weighing 2.22 kgs Per m2 , Including Bends, Tying Wire and Distance Blocks:-</u> | | | | |

| | | | | | |
|------|--|----|------|--|--|
| 1.26 | Fabric reinforcement with minimum 150mm wide side and end laps, laid in bed | m2 | 5 | | |
| | <u>Provide and Fix High Tensile Steel Reinforcement to SRN 127 including Cutting, Bending, Propping With Spacers and Tying as Specified :-</u> | | | | |
| 1.27 | Reinforcement, all diameters | Kg | 3300 | | |
| | <u>FORMWORK</u> | | | | |
| | <u>Provide and Fix Shuttering Including Propping, Strutting and Striking, all as Specified</u> | | | | |
| | <u>Sawn Formwork - Class F1 Finish:-</u> | | | | |
| 1.28 | Sides of 300mm thick pump house base slab | m2 | 11 | | |
| 1.29 | Sides of 150mm thick pump house base slab | m2 | 1 | | |
| 1.30 | Sides of 300mm column bases and columns in the foundations | m2 | 10 | | |
| 1.31 | Sides of 300mm Walls Strip footings - Pump house walls | m2 | 20 | | |
| 1.32 | Drainage sump internal size 400mm long x400mm wide x 1000mm deep made out of 150mm thick reinforced concrete base and walls including forming rebate 50mm wide x 75mm deep to top inner edges of sump wall to receive chequer plate cover (m.s.) and including all necessary excavation, disposal and formwork | m2 | 1 | | |
| 1.33 | Form cable duct internal size 200mm wide x 250mm deep in concrete floor slab including forming rebate 50mm wide x 75mm deep to top inner edges of channel wall to receive mild steel grating cover (m.s.) | m2 | 7 | | |
| 1.34 | Form drainage channel internal size 150mm wide and depth varying from 150mm to 200mm deep in concrete floor slab including forming rebate 50mm wide x 75mm deep to top inner edges of channel wall to receive mild steel grating cover (m.s.) | m2 | 3 | | |
| | <u>Wrot Formwork - Class F3 Finish:-</u> | | | | |
| 1.35 | Edges of Pump Plinth size 1600mm long x 650mm wide x 300mm deep not exceeding 300mm wide | m | 11 | | |
| | <u>RENDERING</u> | | | | |

| | | | | | |
|------|--|----|----|--|--|
| | 15mm Cement and sand (1:4) render to plinths, finished with a wood float | | | | |
| 1.36 | Pump Plinth size 1600mm long x 650mm wide x 300mm deep including pocket in base slab | m2 | 5 | | |
| | Bonded Cement and Sand (1:4) Screed Bed in One Coat with Approved Hardener incorporated in the Mix, Well Bonded to Concrete Base as Described:- | | | | |
| 1.37 | 40mm Thick paving with wood float finish on pump house slab | m2 | 20 | | |
| | <u>PAINTING AND DECORATING</u> | | | | |
| 1.38 | Prepare and apply two coats of bituminous paint on rendered plinth walls | m2 | 19 | | |
| 1.39 | Provide and apply approved industrial Epoxy floor paint on the Pump House Floor. | m2 | 20 | | |
| | <u>Damp-proof course:</u> | | | | |
| | <u>Bituminous Felt Damp-Proof Course as Described:-</u> | | | | |
| 1.40 | 200mm Wide under walls | m | 15 | | |
| | <u>Joint Filler</u> | | | | |
| 1.41 | 20mm Thick resin bonded cork filler between 1600 x 650 x 300mm pump plinth and 300mm thick floor slab sealed with 25mm deep bitumen | m2 | 5 | | |
| | <u>Walling</u> | | | | |
| | <u>Natural Stone Block Walling, Medium Chisel Dressed, Reinforced with 20 swg Hoop Iron at every third course, and Bedded, Jointed and Pointed in Cement Mortar (1:4):-</u> | | | | |
| 1.42 | 200 mm Walling | m2 | 15 | | |
| | <u>SUPERSTRUCTURE</u> | | | | |
| | <u>CONCRETE WORKS</u> | | | | |
| | <u>Guaranteed Strength Reinforced Concrete Class 25/20mm as Described in:</u> | | | | |
| 1.43 | Upstand for the control panel | m3 | 1 | | |

| | | | | | |
|------|---|----|-----|--|--|
| 1.44 | Columns | m3 | 2 | | |
| 1.45 | Beams | m3 | 3 | | |
| | Precast Concrete Paving Slabs | | | | |
| 1.46 | Slabs size 600 x 600 x 50mm Thick laid on and including 50mm thick bed of sand and jointing and pointing in cement mortar | m2 | 50 | | |
| | REINFORCEMENT | | | | |
| | Provide and Fix High Tensile Steel Reinforcement to SRN 127 including Cutting, Bending, Propping with Spacers and Tying as Specified :- | | | | |
| 1.47 | Reinforcement, all diameters | kg | 720 | | |
| | FORMWORK | | | | |
| | Provide and Fix Shuttering Including Propping, Strutting and Striking, all as Specified. | | | | |
| 1.48 | Upstand for the control panel, columns and beams in the superstructure. | m2 | 35 | | |
| | WALLING | | | | |
| | Selected Machine Dressed Natural Stone Block Walling, Reinforced with 20 swg Hoop Iron at Every Third Courses, and Bedded, Jointed and Pointed in Cement Mortar (1:5):- | | | | |
| 1.49 | 200mm Thick walling | m2 | 30 | | |
| | Labours | | | | |
| 1.50 | Extra over walling for ruled horizontal and flush vertical joints | m2 | 12 | | |
| | Precast Concrete Cills | | | | |
| 1.51 | 200mm Thick x 275mm wide precast concrete cill bedded, jointed and pointed in cement mortar on top of 200mm wall | m | 8 | | |
| | PLASTERING | | | | |
| 1.52 | 12.5mm thick cement gauged plaster internally on blockwork surfaces | m2 | 30 | | |
| | RENDERING | | | | |

| | | | | | |
|------|--|----|----|--|--|
| 1.53 | 12.5mm thick cement and sand rendering externally on concrete surfaces | m2 | 10 | | |
| | METALWORK | | | | |
| | Rates to include for Provision of all Material, Fabrication and Fixing | | | | |
| | Floor Gratings | | | | |
| 1.54 | Mild steel grating drain channel cover 140mm wide x 2900mm long made out of 16mm round m.s transverse bars welded at 20mm spacing to 16mm round m.s longitudinal bars welded to 38 x 38 x 6mm thick m.s angles | m2 | 2 | | |
| 1.56 | Mild steel chequer plate cover for cable duct internal size 200mm wide x 150mm deep | m2 | 3 | | |
| | Steel Doors | | | | |
| | Pressed Metal Louvre Doors | | | | |
| | Supply and Fix the Following Pressed Metal Louvre Doors with 100 x 50mm Stiles and Top Rails, 150 x 50mm Middle and Bottom Rails With Pressed Metal Infill Louvres and 100 x 50mm Pressed Metal Frames, Including Hinges, Pad Bolts and Tower Bolts, All To Manufacturer's Details, With Three Coats Gloss Paint Complete With Opening Accessories Including Bedding and Pointing Around Frames in Cement Mortar:- | | | | |
| 1.57 | Double door size 1200 x 2400 mm high in two equal panels | Nr | 1 | | |
| | Steel Casement Windows | | | | |
| | Supply and Fix the following Standard Section Steel Casement Windows, including 4mm Thick Clear Sheet Glass glazed to Steel Casements with putty, complete with the following, all finished with three coats oil paint:- | | | | |
| | - Opening accessories, including building in lugs to jambs and head and water-proofing and filling around opening with approved compound | | | | |
| | - Solid Timber Window Board, 200mm wide x 25mm thick, exposed edge with bull-nose finish | | | | |

| | | | | | |
|--------|---|------|-----|--|--|
| | - Burglar-Proofing Fabricated from 12 x 12mm Mild Steel Square Bars at 150mm Centres Vertically and 150mm Horizontally and Fixed Internally to Surrounding Wall with 12mm Mild Steel Fish-Tailed Lugs at Maximum 600mm Centres; | | | | |
| 1.58 | Window size 1200 x 1200mm high in 3 equal panels with upper part having 2 No. fixed and 1 No. top hung ventilator, and lower half having 2 No. side-hung panels opening outward and 1 No. fixed panel (W1) | Nr | 1 | | |
| | <u>PVC Gauze Screen set on and including a Timber Framing all Round and Fixing to Wall :-</u> | | | | |
| 1.59 | Gauze size 1275 x 600mm high | Nr | 4 | | |
| 1.60 | Gauze size 1800 x 870mm high | Nr | 2 | | |
| | <u>Precast Concrete Louvre Block Walling :-</u> | | | | |
| 1.66.1 | 200mm Thick louvre block walling with twin section with plastic coated coffee tray wire sandwiched between sections | m2 | 8 | | |
| | PAINTING AND DECORATING | | | | |
| | Prepare and Apply Three Coats Exterior Quality Plastic Emulsion Paint:- | | | | |
| | Externally on:- | | | | |
| 1.62 | Fair-faced concrete surfaces | m2 | 10 | | |
| | Prepare and Apply Three Coats Interior Quality Plastic Emulsion Paint:- | | | | |
| | Internally on:- | | | | |
| 1.63 | Plastered blockwork and concrete surfaces | m2 | 30 | | |
| 1.64 | Allow for painting of all pipework within the Pump House with 3 coats of approved super gloss paint applied on 1 coat primer | Item | L.S | | |
| | Prepare and Apply Three Coats Washable Distemper as Described to:- | | | | |
| 1.65 | Horizontal soffites of suspended chipboard or plasterboard ceilings | m2 | 15 | | |
| | ROOF COVERINGS | | | | |

| | | | | | |
|------|--|----|----|--|--|
| | Concrete, Single Lap Interlocking Roof Tiles on and Including Sawn Cypress (Grade 2) Battens Size 40 x 40mm Pressure Impregnated with Approved Preservative:- | | | | |
| 1.66 | Roof tiles | m2 | 15 | | |
| | Extra Over Roofing Tiles for:- | | | | |
| 1.67 | Ridge capping including bedding and pointing in cement sand (1:4) mortar with colouring to match colour of tiles | m | 3 | | |
| 1.68 | Hip capping ditto | m | 18 | | |
| 1.69 | Filled ends of ridge capping or hip capping | Nr | 6 | | |
| 1.70 | Fair raking cutting roofing tiles | m | 18 | | |
| 1.71 | Gauge 28 galvanised plain sheets as laid as underlay and nailed to rafters (m ²) | m2 | 15 | | |
| | CARPENTRY AND JOINERY | | | | |
| | Carpentry | | | | |
| | Roof Trusses | | | | |
| | Double Pitch Roof Truss With 600mm Eaves Projection, in 150 x 50mm Rafters, Ceiling joists, Struts and Ties in Sawn Cypress Grade II Seasoned and Pressure Impregnated with Wood Preservative and timber joints with Bolted and Nailed Connections to the Engineer's Approval :- | | | | |
| 1.72 | Equal truss 3600mm clear span and 1560mm high at 1500mm c/c | Nr | 2 | | |
| | Other Roof Members | | | | |
| | Sawn Cypress Grade II Maximum Moisture Content 12% Seasoned and Pressure Impregnated with Wood Preservative and Timber Joints With Bolted and Nailed Connections to the Engineer's Approval:- | | | | |
| 1.73 | 150 x 50mm Intermediate and hip rafters | m | 45 | | |
| 1.74 | 150 x 75mm Purlins | m | 9 | | |
| 1.75 | 180 x 50mm Ridge board | m | 3 | | |
| 1.76 | 100 x 50mm Wall plate tied to wall with 20 s.w.g. hoop iron at 900mm centres and bedded in cement mortar (1:4) on top of wall | m | 15 | | |

| | | | | | |
|---|---|------|-----|--|--|
| | Joinery | | | | |
| | General Timbers | | | | |
| | Wrot Prime Grade Cypress, Including Finishing With Three Coats First Quality Gloss Paint :- | | | | |
| 1.77 | 250 x 40mm Fascia board, fixed with screws | m | 15 | | |
| PAGE TOTAL CARRIED TO SECTION COLLECTION SHEET | | | | | |
| 2 | CEILING | | | | |
| | 12mm Thick Approved Chipboard to BS 2604, Part 2, density 480-640kgs, per Square Meter in Sheets Size 2400 x 1200mm Fixed to and Including 50 x 50mm Sawn Cypress Grade 2 Battens at 600mm Centres in Both Directions Complete with Gauge Jointing Material | | | | |
| 2.1 | Horizontal ceiling fixed to underside of trusses | m2 | 15 | | |
| 2.2 | 12mm Cornice 50mm high, plugged | m | 15 | | |
| 2.3 | Extra over ceiling lining for forming removable access trap door size 600 x 600mm with 100 x 38 mm sawn treated cypress trimming joists between tie beams, 120 x 20mm (finished) wrot cypress frame all round and 20mm blockboard removable panel set loose on top of framing. | Nr | 1 | | |
| | Builders Work in Connection with Electrical Installations | | | | |
| 2.4 | Allow for cutting and leaving all necessary holes, notches, mortices, sinkings and chases both in the structure and its finishes and for all making good in connection with concealed conduits or cables | Item | L.S | | |
| | PIPEWORK AND FITTINGS | | | | |
| | Supply, Transport to Site and Store in Secure Place, Including Jointing Material, Bolts, Gaskets, Packing, Jointing Glues, etc. as Applicable | | | | |
| | Backwash Pumps - Suction Main (Approved Lined Ferrous Pipe Fittings to Class NP 16) | | | | |
| 2.5 | 200mm dia. special 90° bend, one end flanged, other end bellmouth shaped (Mark A) | Nr | 1 | | |
| 2.6 | 200mm dia. all flanged spigot pipe, length 1800mm with puddle flange 1000m from flanged end (Mark B) | Nr | 1 | | |

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|------|--|----|---|--|--|
| 2.7 | 200mm dia. Flanged adapter (Mark C) | Nr | 1 | | |
| 2.8 | 200 mm dia. all Flanged 90° bend (Mark D) | Nr | 1 | | |
| 2.9 | 200mm dia. All Flanged, 1205mm long pipe (Mark E) | Nr | 1 | | |
| 2.10 | 200mm x 200mm dia. all flanged tee (Mark F) | Nr | 1 | | |
| 2.11 | 200mm x 150mm dia. all flanged tee (Mark G) | Nr | 1 | | |
| 2.12 | 200mm dia. Blank flange (Mark H) | Nr | 2 | | |
| 2.13 | 150mm dia. all flanged pipe 1075mm long with puddle flange at 450mm from one end (Mark I) | Nr | 1 | | |
| 2.14 | 150mm dia. Flange adaptor (Mark J) | Nr | 1 | | |
| 2.15 | 150mm double flange gate valve (Mark K) | Nr | 1 | | |
| 2.16 | 150mm x 80mm dia. Special all flanged eccentric taper (Mark L) | Nr | 1 | | |
| | Backwash Pumps - Delivery Main (Approved Lined Ferrous Pipe Fittings to Class NP 16) | | | | |
| 2.17 | Special 100mm x 65mm all flanged concentric taper with 25mm dia. Male threaded tapping for pressure gauge (Mark 1) | Nr | 1 | | |
| 2.18 | 25mm dia. pressure gauge (pressure class up to 10 bars) - Hunter or approved equivalent (Mark 2) | Nr | 1 | | |
| 2.19 | 100mm dia. all flanged 90° bend (Mark 3) | Nr | 1 | | |
| 2.20 | 100mm dia. all flanged free acting check valve (Non return valve) (Mark 4) | Nr | 1 | | |
| 2.21 | 100mm dia. all flanged gate valve to BS 5163 (short face to face) (Mark 5) | Nr | 1 | | |
| 2.22 | 100mm dia. flange adaptor (Mark 6) | Nr | 2 | | |
| 2.23 | 100mm dia. flanged spigot pipe, length 1020mm (Mark 7) | Nr | 1 | | |
| 2.24 | 100mm x 100mm x 50mm dia. all flanged tee (Mark 8) | Nr | 1 | | |

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|------|--|----|---|--|--|
| 2.25 | 50mm dia. Single orifice air valve with built in isolating valve (Mark 9) | Nr | 1 | | |
| 2.26 | 100mm dia. flanged spigot pipe 1405mm long (Mark 10) | Nr | 1 | | |
| 2.27 | 150mm x 100mm dia. all flanged tee (Mark 11) | Nr | 1 | | |
| 2.28 | 150mm dia. blank flange (Mark 12) | Nr | 1 | | |
| 2.29 | 150mm dia. all flanged pipe, length 900mm (Mark 13) | Nr | 1 | | |
| 2.30 | 150 mm dia. flanged 90° bend (Mark 14) | Nr | 1 | | |
| | 150mm dia. Flanged spigot pipe, 1200mm long (Mark 15) | Nr | 1 | | |
| 2.31 | 150mm dia. Coupling (Mark 16) | Nr | 1 | | |
| | Transport From Site Store, Install, Test and Commission | | | | |
| | Backwash Pumps - Suction Main (Approved Lined Ferrous Pipe Fittings to Class NP 16) | | | | |
| 2.32 | 200mm dia. special 90° bend, one end flanged, other end bellmouth shaped (Mark A) | Nr | 1 | | |
| 2.33 | 200mm dia. all flanged spigot pipe, length 1800mm with puddle flange 1000m from flanged end (Mark B) | Nr | 1 | | |
| 2.34 | 200mm dia. Flanged adapter (Mark C) | Nr | 1 | | |
| 2.35 | 200 mm dia. all Flanged 90° bend (Mark D) | Nr | 1 | | |
| 2.36 | 200mm dia. All Flanged, 1205mm long pipe (Mark E) | Nr | 1 | | |
| 2.37 | 200mm x 200mm dia. all flanged tee (Mark F) | Nr | 1 | | |
| 2.38 | 200mm x 150mm dia. all flanged tee (Mark G) | Nr | 1 | | |
| 2.39 | 200mm dia. Blank flange (Mark H) | Nr | 2 | | |
| 2.40 | 150mm dia. all flanged pipe 1075mm long with puddle flange at 450mm from one end (Mark I) | Nr | 1 | | |
| 2.41 | 150mm dia. Flange adaptor (Mark J) | Nr | 1 | | |
| 2.42 | 150mm double flange gate valve (Mark K) | Nr | 1 | | |

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|---|--|----|---|--|--|
| 2.43 | 150mm x 80mm dia. Special all flanged eccentric taper (Mark L) | Nr | 1 | | |
| | Backwash Pumps - Delivery Main (Approved Lined Ferrous Pipe Fittings to Class NP 16) | | | | |
| 2.44 | Special 100mm x 65mm all flanged concentric taper with 25mm dia. Male threaded tapping for pressure gauge (Mark 1) | Nr | 1 | | |
| 2.45 | 25mm dia. pressure gauge (pressure class up to 10 bars) - Hunter or approved equivalent (Mark 2) | Nr | 1 | | |
| 2.46 | 100mm dia. all flanged 90° bend (Mark 3) | Nr | 1 | | |
| 2.47 | 100mm dia. all flanged free acting check valve (Non return valve) (Mark 4) | Nr | 1 | | |
| 2.48 | 100mm dia. all flanged gate valve to BS 5163 (short face to face) (Mark 5) | Nr | 1 | | |
| 2.49 | 100mm dia. flange adaptor (Mark 6) | Nr | 1 | | |
| 2.50 | 100mm dia. flanged spigot pipe, length 1020mm (Mark 7) | Nr | 1 | | |
| 2.51 | 100mm x 100mm x 50mm dia. all flanged tee (Mark 8) | Nr | 1 | | |
| 2.52 | 50mm dia. Single orifice air valve with built in isolating valve (Mark 9) | Nr | 1 | | |
| 2.53 | 100mm dia. flanged spigot pipe 1405mm long (Mark 10) | Nr | 1 | | |
| 2.54 | 150mm x 100mm dia. all flanged tee (Mark 11) | Nr | 1 | | |
| 2.55 | 150mm dia. blank flange (Mark 12) | Nr | 1 | | |
| 2.56 | 150mm dia. all flanged pipe, length 900mm (Mark 13) | Nr | 1 | | |
| 2.57 | 150 mm dia. flanged 90° bend (Mark 14) | Nr | 1 | | |
| 2.58 | 150mm dia. Flanged spigot pipe, 1200mm long (Mark 15) | Nr | 1 | | |
| 2.59 | 150mm dia. Coupling (Mark 16) | Nr | 1 | | |
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|--|---|------|-----|--|--|
| 3 | PUMPS | | | | |
| | Backwash Pumps | | | | |
| 3.1 | Supply, transport to site, install, test and commission centrifugal pumps (1 duty) complete with motor, base plate, fixing bolts, grouting, etc., for the following characteristics: Flow 50m ³ per hour, dynamic head 20m, KSB Etanorm 80-250 or approved equivalent. | Nr | 1 | | |
| 4 | PIPE SUPPORTS AT BACKWASH PUMPS DELIVERY MAIN | | | | |
| 4.1 | Supply and Install pipe support made of 100mm dia. pipe 1500mm long, welded to 6mm M.S plate at bottom, fixed to floor with 4Nrs. 16mm dia. Bolts | Item | L.S | | |
| PAGE TOTAL CARRIED TO COLLECTION SHEET | | | | | |
| | COLLECTION PAGE | | | | |
| | PUMP HOUSE | | | | |
| | Collection No. 1 | | | | |
| | Collection No. 2 | | | | |
| | Collection No. 3 | | | | |
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BILL NO. 7 - TREATED MAINLINE

| ITEM | DESCRIPTION | Unit | QTY | RATE (KShs.) Inclusive of VAT | A MOUNT (K Shs .) |
|------|--|------|-------|-------------------------------|-------------------|
| 1 | Clearance | | | | |
| 1.1 | Clear line of all bushes and shrubs and remove debris from site average width 1.2m as directed by the Engineer | m | 4,000 | | |
| | | | | | |

| | | | | | |
|-----|---|----------------|-------|--|--|
| 2 | <u>EXCAVATION AND EARTHWORKS</u> | | | | |
| | - | | | | |
| 2.1 | Excavate in pipe trench for pipe diameter 225mm, average of 1.2m but not exceeding 1.5m deep, minimum pipe cover 1000mm, backfilling after pipe fixing and disposal of excess material after backfilling | M | 3,960 | | |
| 2.2 | Ditto excavation exceeding 1.5 m but not exceeding 3.0m | M | 440 | | |
| 2.5 | Extra over for excavation in rock as described and defined in the specifications. (Provisional) | M ³ | 50 | | |
| 2.6 | Allow for compacted bedding and pipe surrounding (150mm thick all round the pipe) with approved selected excavated material in approved rocky areas to the satisfaction of the Engineer. (Provisional) | M | 100 | | |
| 2.7 | Allow for compacted pipe bedding and pipe surrounding (150mm thick all round the pipe) with approved imported material in approved rocky areas to the satisfaction of the Engineer. (Provisional) | M | 100 | | |
| 3 | Tree Cutting | | | | |
| | Allow for cutting and disposal of trees, including cutting and disposal of trunks, branches and removal and disposal of stumps, roots, and earth filling in the depression/pit. | | | | |
| 3.1 | Girth from 300 mm to 600 | Nr. | 2 | | |
| 3.2 | Girth from 600 mm to 900 mm | Nr. | 1 | | |
| 3.3 | Girth from 900 mm to 1800 mm | Nr. | 1 | | |
| 4 | Pipework-Supply and Install | | | | |

| | | | | | |
|-----|--|-----|------|--|--|
| | <u>Supply, Lay and fuse HDPE pipes and fittings as described, rates to include necessary trimming alignment. Rates to include for Supply of pipes and associated appurtenances, transport to site, excavate for, lay, joint, test and backfill. The pipes and fittings are to be laid in accordance with Drawings provided and to the engineers instructions</u> | | | | |
| 4.1 | OD 225mm HDPE PN10 | m | 3020 | | |
| 4.2 | OD 225mm HDPE PN12.5 | m | 590 | | |
| 4.3 | OD 225mm HDPE PN16 | m | 420 | | |
| | | | | | |
| 5 | <u>Extra over for pipework in the following :-</u> | | | | |
| | Norminal Bore 225mm diameter 'HDPE bend PN 16 | | | | |
| 5.1 | 90° | No. | 8 | | |
| 5.2 | 45° | No. | 7 | | |
| | AUXILLIARY WORKS | | | | |
| 6 | Valves | | | | |
| 6.1 | Supply, install and test Wash outs assembly; with integral isolating valve; fittings and outfall structure Nomial Bore 80 mm and all associated fittings on 225mm dia HDPE pipe as per the drawings. | No. | 4 | | |
| 6.7 | Supply, install and test Air Valves assembly: triple action, anti surge, anti shock, c/w separate female threaded stop cock/isolator and isolating valve, PN 12.5 and all associated fittings on 225mm dia HDPE pipe as per the drawings | No. | 7 | | |
| | | | | | |
| 6.8 | Supply, install and test branch assembly for offtakes: Fittings to include Gate Valve, Tees, steel pipes in chambers, stub ends and steel flanges on 225mm dia HDPE pipe as per the drawings. | No. | 2 | | |
| 6.7 | Road Crossings | | | | |
| | Road Crossings-Murram and Earth | | | | |
| 7.1 | Breaking up, Temporary and Permanent Reinstatement of MURRAM road with 300mm thick well graded stabilised gravel with 3% cement content base compacted in layers of 150mm thick using an 8-10 tonne roller to the satisfaction of the Engineer. Contractor to allow for provision of requisite diversion signage, controls and safety precaution in his rates, nominal bore not exceeding 300mm. | m | 12 | | |

| | | | | | |
|------|--|-----|-------|--|--|
| 7.2 | Provide all material and construct concrete ogee pipe sleeve and 150mm thick class 15/20 mass concrete surround to HDPE pipe under Murrum and Earth Road Crossings diameter of pipe n.e. 300mm as per | m | 12 | | |
| | | | | | |
| | Road Crossings-Tarmac | | | | |
| 7.3 | Provide all equipment and materials, excavate below road surface in common material (soil/murram) using trenchless technique.(e.g. Pipe Jacking, horizontal drilling, etc). The rate includes all preparatory works, any requisite shoring, strutting, installation of pipe and pipe casing and necessary grouting and reinstatement, etc. pipe nominal bore n.e.300mm. all works to be executed in close liaison with relevant road authorities and rates to include facilitation of the same. The Bidder to submit Method Statement with Bid for execution of these Works. | m | 6 | | |
| 8 | Anchor and Thrust Blocks | | | | |
| 8.1 | Supply all materials and construct 0.3M ³ anchor blocks as per drgs and as instructed by the Engineer. | No. | 4 | | |
| | | | | | |
| 9 | Chambers | | | | |
| 9.1 | Provide all materials and construct valve chambers(for AV,WO and Branch chambers) of internal dimensions 1200 x 1200 mm as per the MoWIS standard drawings and the fitting schedule for the specific nodes . Include for supply and fixing of precast concrete cover and step irons, etc as detailed in the drawings and as instructed by the Engineer | No. | 13 | | |
| | | | | | |
| 10 | Testing | | | | |
| 10.1 | Allow for Testing & Flushing of Pipelines and Fittings. Pressure Testing at 1.5 times the pipe pressure rating as per the specifications | M | 4,000 | | |
| | | | | | |
| 11 | Marker Posts | | | | |
| | Marker Posts as per Drawings. Provide and install Marker Posts. | | | | |
| 11.1 | Marker posts (Pipeline) | Nr. | 10 | | |
| | | | | | |
| 11.2 | Marker posts (Washout) | Nr. | 7 | | |

| | | | | | |
|------|----------------------------|-----|---|--|--|
| 11.3 | Marker posts (Air Valve) | Nr. | 4 | | |
| 11.4 | Marker posts (Suice Valve) | Nr. | 2 | | |

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BILL No. 8

KAHARO - 100m3 ELEVATED TANK

| ITEM No. | DESCRIPTION | UNIT | Q T Y | RATE (Kshs) | A M O U N T (Ks hs) |
|-------------|---|------|-------------|--------------------|--|
| 1 | <u>Excavation</u> <u>Excavation shall include strutting,shuttering,stablizing excavated surface and keeping excavations free of water bailing out, pumping or other means</u> | | | | |
| 1.1 | Excavate to reduced levels in top soil for depth not exceeding 0.25 | M3 | 13 | | |
| 1.2 | Excavate for tank foundation 0.25-0.5m | M3 | 15 | | |
| 1.3 | Ditto but in material other than top soil,rock or hard material depth 0.5-1m | M3 | 15 | | |
| 1.5 | Ditto but in rock depth exceeding 1m | M3 | 15 | | |
| | <u>Filling</u> <u>Filling to completed structure including compaction as specified</u> | | | | |
| 1.6 | Fill and compact selected excavated material other than top soil,rock or artificially hard material | M3 | 31 | | |
| | <u>Disposal of Excavated Materials</u> | | | | |
| 1.7 | Dispose excavated materials other than rock as directed by the Engineer | M3 | 5 | | |
| 1.8 | Dispose excavated material rock or artificially hard materials on site as directed by the Engineer | M3 | 3 | | |
| 2 | <u>In situ Concrete:Provision and placing.</u> <u>Rate to include for shuttering</u> | | | | |

| | | | | |
|----------|---|----|------|--|
| | <u>Mass concrete Class 15/20</u> | | | |
| 2.1 | Blinding layer 50mm thick | M3 | 1 | |
| | <u>Reinforced Vibrated Concrete Class 30/20 (ready mix)</u> | | | |
| 2.2 | Footing and stub columns for steel columns | M3 | 19 | |
| | Reinforcement | | | |
| | <u>High yield hot rolled ribbed bars BS4449.Rate to include for Supply.delivering.cutting.bending.supporting and securing in concrete.</u> | | | |
| 2.3 | High Yield bars | kg | 2220 | |
| 3 | 1 No ElevatedSteel Tower | | | |
| | Supply and erect 12m steel Tower frame as per the drawings and specifications.Plate thickness to be 6.0mm for the tank bottom and first level side panels, 4.5mm thick plates for the second and third levels side panels and 2mm for roof. Include for all bolts,jointing material, protection paint and any other necessary materials. Tank panels to be wire brushed and painted externally with one coat of grey primer and two coats of silver aluminium paint. Internally the panels are painted with two coats of non-toxic black bituminous paint. Touch up paint to be applied at site after erection to cover any marks | Nr | 1 | |
| 4 | Pressed Steel Tank | | | |

| | | | | |
|---|--|----|---|---|
| | <p>Supply and install pressed steel tank 100m³ capacity complete with roof access hatch,access ladder,float level indicator,pipework and 12m steel Tower frame as per the drawings and specifications.Plate thickness to be 6.0mm for the tank bottom and first level side panels, 4.5mm thick plates for the second and third levels side panels and 2mm for roof. Include for all bolts,jointing material, protection paint and any other necessary materials. Tank panels to be wire brushed and painted externally with one coat of grey primer and two coats of silver aluminium paint. Internally the panels are painted with two coats of non-toxic black bituminous paint. Touch up paint to be applied at site after erection to cover any marks</p> | Nr | 1 | |
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| <u>SUMMARY PAGE</u> | | |
|--|--|---------------|
| CONSTRUCTION OF WATER TREATMENT WORKS AND REHABILITATION OF WATER SUPPLY PIPELINES FOR MWAI KIBAKI NATIONAL HOSPITAL - LEVEL VI (PRICES ARE INCLUSIVE OF 16% VAT) | | |
| ITEM | DESCRIPTION | AMOUNT |
| | | KES |
| 1 | <i>PRELIMINARIES AND GENERAL ITEMS</i> | |
| 2 | <i>DAYWORKS</i> | |
| 3 | <i>STILLING WELL, CHEMICAL DOSING CHANNEL AND FLOCCULATION CHANNEL</i> | |
| 4 | <i>SEDIMENTATION TANK</i> | |
| 5 | <i>FILTERS AND FILTER GALLERY</i> | |
| 6 | <i>150M3 CLEAR WATER TANK</i> | |
| 7 | <i>PUMP HOUSE</i> | |

| | | |
|---|-------------------------------|--|
| | | |
| 8 | <i>TREATED MAINLINE</i> | |
| | | |
| 9 | <i>ELEVATED BACKWASH TANK</i> | |
| | | |
| | TOTAL | |
| | | |
| | ADD 5% FOR CONTIGENCIES | |
| | | |
| | GRAND TOTAL | |

SECTION XII: DRAWINGS