TANA WATER WORKS DEVELOPMENT AGENCY

CONSTRUCTION WORKS FOR KIAMUCUKU WATER SUPPLY PROJECT IN KIRINYAGA COUNTY AND THE IDENTIFIED PAINTING WORKS AT TWWDA OFFICES

(RESERVED FOR FIRMS OWNED BY WOMEN)

TENDER NO: TWWDA/T/005/2025-2026

CLOSING DATE: THURSDAY 14th MAY 2026

Employer

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

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NAME AND CONTACT ADDRESSES OF PROCURING ENTITY

Name: **Tana Water Works Development Agency**

Address: **P.O. Box 1292-10100, Nyeri**

Email address: **ceo@tanawwda.go.ke**

(2) Invitation to Tender (ITT) No: TWWDA/T/005/2025 - 2026

(3) Tender Name: CONSTRUCTION OF KIAMUCUKU WATER SUPPLY PROJECT IN KIRINYAGA COUNTY AND PAINTING WORKS AT TWWDA (RESERVED FOR FIRMS OWNED BY WOMEN)

INVITATION TO TENDER

PROCURING ENTITY: *Tana Water Works Development Agency, P.O. Box 1292-10100, Nyeri*

CONSTRUCTION OF KIAMUCUKU WATER SUPPLY PROJECT IN KIRINYAGA COUNTY AND PAINTING WORKS AT TWWDA (RESERVED FOR FIRMS OWNED BY WOMEN)

The *Tana Water Works Development Agency* invites sealed tenders for **Construction of Kiamucuku Water Supply Project and re-painting of TWWDA (Reserved for Firms Owned By Women)**

Tendering will be conducted under open competitive method (National) using a standardized tender document. Tendering is open to all qualified and interested Tenderers.

1. Qualified and interested tenderers may obtain further information and inspect the Tender Documents during office hours 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 at the address given below.

2. A complete set of Tender Document in English (Compact Disc Version) may be purchased or obtained by interested applicants upon payment of a non-refundable fees of **Ksh.1000** cash or Banker's Cheque and payable to the address given below.

3. Tender documents may be viewed and downloaded for free from the website www.tanawwda.go.ke and the Public Procurement Information Portal (PPIP): https://tenders.go.ke. Tenderers who download the tender document must forward their particulars immediately to Email: ceo@tanawwda.go.ke or info@tanawwda.go.ke /Telephone:+2540612032282/+254 724259891, P.O. Box 1292-10100, Nyeri to facilitate any further clarification or addendum.

4. All Tenders must be accompanied by a *"Tender Security Declaration Form"*.

5. The Tenderer shall chronologically serialize all pages of the tender documents submitted.

6. Completed tenders must be delivered to the address below on or before ***Thursday 14th May 2026 at 10:00 a.m.*** Electronic Tenders ***will not*** be permitted.

7. Tenders will be opened immediately after the deadline date and time specified above or any deadline date and time specified later. Tenders will be publicly opened in the presence of the Tenderers' designated representatives who choose to attend at the address below.

8. Late tenders will be rejected.

9. The addresses referred to above are:
   Chief Executive Officer,
   Tana Water Works Development Agency
   P.O. Box 1292 – 10100
   Nyeri, Maji House, Baden Powell Road

A. Address for obtaining further information and for purchasing tender documents

1) Name of Procuring Entity: Tana Water Works Development Agency

(1) Physical address for hand Courier Delivery to an office or Tender Box: Nyeri, Baden Powell Road, Maji House

(2) Postal Address P.O. Box 1292-10100, Nyeri

(3) Officer to be contacted: Chief Executive Officer, +2540612032282/+2540724259891, ceo@tanawwda.go.ke or info@tanawwda.go.ke

B. Address for Submission of Tenders.

(1) Name of Procuring Entity: Tana Water Works Development Agency

(2) Postal Address: Chief Executive Officer, P.O. Box 1292-10100, Nyeri

(3) Physical address for hand Courier Delivery to an office or Tender Box: Nyeri, Baden Powell Road, Maji House

C. Address for Opening of Tenders.

(1) Name of Procuring Entity: Tana Water Works Development Agency

(2) Physical address for the location: Nyeri, Baden Powell Road, Maji House

Eng. Philip Gichuki, MBS

Designation: **Chief Executive Officer**

Signature_____

Date: 24/04/2026

PART 1 - TENDERING PROCEDURES

SECTION I-INSTRUCTIONS TO TENDERERS

A GENERALPROVISIONS

1. Sope of Tender

1.1 The Procuring Entity, as defined in the Appendix to Conditions of Contract invites tenders for Works Contract as described in the tender documents. The name, identification, and number of lots (contracts) of this Tender Document are **specified in the TDS.**

2. Fraud and Corruption

2.1 The Procuring Entity requires compliance with the provisions of the Public Procurement and Asset Disposal Act, 2015, Section 62 "Declaration not to engage in corruption". The tender submitted by a person shall include a declaration that the person shall not engage in any corrupt or fraudulent practice and a declaration that the person or his or her sub-contractors are not debarred from participating in public procurement proceedings.

2.2 The Procuring Entity requires compliance with the provisions of the Competition Act 2010, regarding collusive practices in contracting. Any tenderer found to have engaged in collusive conduct shall be disqualified and criminal and/or civil sanctions may be imposed. To this effect, Tenders shall be required to complete and sign the "Certificate of Independent Tender Determination" annexed to the Form of Tender.

2.3 Tenderers shall permit and shall cause their agents (where declared or not), subcontractors, sub-consultants, service providers, suppliers, and their personnel, to permit the Procuring Entity to inspect all accounts, records and other documents relating to any initial selection process, pre-qualification process, tender submission, proposal submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the Procuring Entity.

2.4 Unfair Competitive Advantage -Fairness and transparency in the tender process require that the firms or their Affiliates competing for a specific assignment do not derive a competitive advantage from having provided consulting services related to this tender. Finally, the Procuring Entity shall indicate in the **Data Sheet** and make available all the firms together with this tender document all information that would in that respect give such firm any unfair competitive advantage over competing firms.

3. EligibleTenderers

3.1 A Tenderer may be a firm that is a private entity, a state-owned enterprise or institution subject to ITT 3.8, or an individual or any combination of such entities in the form of a joint venture (JV) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the tendering process and, in the event the JV is awarded the Contract, during contract execution. Members of a joint venture may not also make an individual tender, be a subcontractor in a separate tender or be part of another joint venture for the purposes of the same Tender. The maximum number of JVmembers shall be specified in the **TDS.**

3.2 Public Officers of the Procuring Entity, their Spouses, Child, Parent, Brothers or Sister. Child, Parent, Brother or Sister of a Spouse, their business associates or agents and firms/organizations in which they have a substantial or controlling interest shall not be eligible to tender or be awarded a contract. Public Officers are also not allowed to participate in any procurement proceedings.

3.3 A Tenderer shall not have a conflict of interest. Any tenderer found to have a conflict of interest shall be disqualified. A tenderer may be considered to have a conflict of interest for the purpose of this tendering process, if the tenderer:

a) Directly or indirectly controls, is controlled by or is under common control with another tenderer; or
b) Receives or has received any direct or indirect subsidy from another tenderer; or
c) Has the same legal representative as another tenderer; or
d) Has a relationship with another tenderer, directly or through common third parties, that puts it in a position to

influence the tender of another tenderer, or influence the decisions of the Procuring Entity regarding this tendering process; or

e) Any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the goods or works that are the subject of the tender; or

f) any of its affiliates has been hired (or is proposed to be hired) by the Procuring Entity as a consultant for Contract implementation; or

g) Would be providing goods, work, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the contract specified in this Tender Document; or

h) Has a close business or personal relationship with senior management or professional staff of the Procuring Entity who has the ability to influence the bidding process and:
   i) are directly or indirectly involved in the preparation of the Tender document or specifications of the Contract, and/or the Tender evaluation process of such contract; or
   ii) may be involved in the implementation or supervision of such Contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Procuring Entity throughout the tendering process and execution of the Contract.

3.4 A tenderer shall not be involved in incorrect, coercive, obstructive or fraudulent practice. A tenderer that is proven to have been involved in any of these practices shall be automatically disqualified.

3.5 A Tenderer (either individually or as a JV member) shall not participate in more than one Tender, except for permitted alternative tenders. This includes participation as a subcontractor in other Tenders. Such participation shall result in the disqualification of all Tenders in which the firm is involved. Members of a joint venture may not also make an individual tender, be a subcontractor in a separate tender or be part of another joint venture for the purposes of the same Tender. A firm that is not a tenderer, or a JV member may participate as a subcontractor in more than one tender.

3.6 A Tenderer may have the nationality of any country, subject to the restrictions pursuant to ITT3.9. A Tenderer shall be deemed to have the nationality of a country if the Tenderer is constituted, incorporated or registered in and operates inconformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or sub-consultants for any part of the Contract including related Services.

3.7 A Tenderer that has been debarred from participating in public procurement shall be ineligible to tender or be awarded a contract. The list of debarred firms and individuals is available from the website of PPRA www.ppra.go.ke.

3.8 A Tenderer that is a state-owned enterprise or a public institution in Kenya may be eligible to tender and be awarded a Contract(s) only if it is determined by the Procuring Entity to meet the following conditions, i.e. if it is:
   i) A legal public entity of Government and/or public administration,
   ii) financially autonomous and not receiving any significant subsidies or budget support from any public entity or Government, and
   iii) operating under commercial law and vested with legal rights and liabilities similar to any commercial enterprise to enable it to compete with firms in the private sector on an equal basis.

3.9 Firms and individuals shall be ineligible if their countries of origin are:

a) as a matter of law or official regulations, Kenya prohibits commercial relations with that country, or

b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, Kenya prohibits any import of goods or contracting of works or services from that country, or any payments to any country, person, or entity in that country.

A tenderer shall provide such documentary evidence of eligibility satisfactorily to the Procuring Entity, as the Procuring Entity shall reasonably request.

3.10 Foreign tenderers are required to source at least forty (40%) percent of their contract inputs (in supplies, local subcontracts and labor) from citizen suppliers and contractors. To this end, a foreign tenderer shall provide in its tender documentary evidence that this requirement is met. Foreign tenderers who do not meet this criterion will be automatically disqualified. Information required to enable the Procuring Entity to determine if this condition is met shall be provided for this purpose in *"SECTION III-EVALUATION AND QUALIFICATION CRITERIA, Item 9"*.

3.11 Pursuant to the eligibility requirements of ITT4.10, a tender is considered a foreign tenderer, if the tenderer is not registered in Kenya or if the tenderer is registered in Kenya and has less than 51 percent ownership by Kenyan citizens. JVs are considered as foreign tenderers if the individual member firms are not registered in Kenya or if are registered in Kenya and have less than 51 percent ownership by Kenyan citizens. The JV shall not subcontract to foreign firms more than 10 percent of the contract price, excluding provisional sums.

3.12 The National Construction Authority Act of Kenya requires that all local and foreign contractors be registered with the National Construction Authority and be issued with a Registration Certificate before they can undertake any construction works in Kenya. Registration shall not be a condition for tender, but it shall be a condition of contract award and signature. A selected tenderer shall be given opportunity to register before such award and signature of contract. Application for registration with National Construction Authority may be accessed from the website www.nca.go.ke.

3.13 The Competition Act of Kenya requires that firms wishing to tender as Joint Venture undertakings which may prevent, distort or lessen competition in provision of services are prohibited unless they are exempt in accordance with the provisions of Section 25 of the Competition Act, 2010. JVs will be required to seek exemption from the Competition Authority. Exemption shall not be a condition for tender, but it shall be a condition of contract award and signature. A JV tenderer shall be given opportunity to seek such exemption as a condition of award and signature of contract. Application for exemption from the Competition Authority of Kenya may be accessed from the website www.cak.go.ke.

3.14 A Kenyan tenderer shall be eligible to tender if it provides evidence of having fulfilled his/her tax obligations by producing a valid tax compliance or valid tax certificate issued by the Kenya Revenue Authority.

4. Eligible Goods, Equipment, and Services

4.1 Goods, equipment and services to be supplied under the Contract may have their origin in any country that is not ineligible under ITT3.9. At the Procuring Entity's request, Tenderers may be required to provide evidence of the origin of Goods, equipment and services.

4.2 Any goods, works and production processes with characteristics that have been declared by the relevant national environmental protection agency or by other competent authorities as harmful to human beings and to the environment shall not be eligible for procurement.

5. Tenderer's Responsibilities

5.1 The tenderer shall bear all costs associated with the preparation and submission of his/her tender, and the Procuring Entity will in no case be responsible or liable for those costs.

5.2 The tenderer, at the tenderer's own responsibility and risk, is encouraged to visit and examine and inspect the Site of the 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.

5.3 The Tenderer and any of its personnel or agents will be granted permission by the Procuring Entity to enter up on its premises and lands for the purpose of such visit. The Tenderer shall indemnify the Procuring Entity against all liability arising from death or personal injury, loss of or damage to property, and any other losses and expenses incurred as a result of the examination and inspection.

5.4 The tenderer shall provide in the Form of Tender and Qualification Information, a preliminary description of the proposed work method and schedule, including charts, as necessary or required.

B. CONTENTS OF TENDER DOCUMENTS

6. Sections of Tender Document

6.1 The tender document consists of Parts 1, 2, and 3, which includes all the sections specified below, and which should be read in conjunction with any Addenda issued in accordance with ITT10.

PART 1: **Tendering Procedures** Section I: Instructions to Tenderers Section II: Tender Data Sheet (TDS)

Section III: Evaluation and Qualification Criteria
Section IV: Tendering Forms

PART 2: **Works' Requirements**
Section V: Bills of Quantities Section VI: Specifications Section VII: Drawings

PART3: **Conditions of Contract and Contract Forms**
Section VIII: General Conditions (GCC) Section IX: Particular Conditions of Contract Section X: Contract Forms

6.2 The Invitation to Tender Notice issued by the Procuring Entity is not part of the Contract documents.

6.3 Unless obtained directly from the Procuring Entity, the Procuring Entity is not responsible for the completeness of the Tender document, responses to requests for clarification, the minutes of a pre-arranged site visit and those of the pre-Tender meeting (if any), or Addenda to the Tender document in accordance with ITT 10. In case of any contradiction, documents obtained directly from the Procuring Entity shall prevail.

6.4 The Tenderer is expected to examine all instructions, forms, terms, and specifications in the Tender Document and to furnish with its Tender all information and documentation as is required by the Tender document.

7. Clarification of Tender Document, Site Visit, Pre-Tender Meeting

7.1 ATenderer requiring any clarification of the Tender Document shall contact the Procuring Entity in writing at the Procuring Entity's address **specified in the TDS** or raise its enquiries during the pre-Tender meeting if provided for in accordance with ITT 7.2. The Procuring Entity will respond in writing to any request for clarification, provided that such request is received not later than the period specified in the **TDS p**rior to the deadline for submission of tenders. The Procuring Entity shall forward copies of its response to all tenderers who have acquired the Tender documents in accordance with ITT 7.4, including a description of the inquiry but without identifying its source. If so specified **in the TDS**, the Procuring Entity shall also promptly publish its response at the web page identified in the **TDS**. Should the clarification result in changes to the essential elements of the Tender Documents, the Procuring Entity shall amend the Tender Documents following the procedure under ITT 8 and ITT 22.2.

7.2 The Tenderer, at the Tenderer's own responsibility and risk, is encouraged to visit and examine and inspect the site(s) of the required contracts and obtain all information that may be necessary for preparing a tender. The costs of visiting the Site shall be at the Tenderer's own expense. The Procuring Entity shall specify in the **TDS** if a pre-arranged Site visit and or a pre-tender meeting will be held, when and where. The Tenderer's designated representative is invited to attend a pre-arranged site visit and a pre-tender meeting, as the case may be. The purpose of the site visit and 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 is requested to submit any questions in writing, to reach the Procuring Entity not later than the period specified in the **TDS** before the meeting.

7.4 Minutes of a pre-arranged site visit and those of the pre-tender meeting, if applicable, including the text of the questions asked by Tenderers and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Tenderers who have acquired theTender Documents. Minutes shall not identify the source of the questions asked.

7.5 The Procuring Entity shall also promptly publish anonymized (*no names*) Minutes of the pre-arranged site visit and those of the pre-tender meeting at the web page identified **in the TDS**. Any modification to the Tender Documents that may become necessary as a result of the pre-arranged site visit and those of the pre-tender meeting shall be made by the Procuring Entity exclusively through the issue of an Addendum pursuant to ITT 8 and not through the minutes of the pre-Tender meeting. Non-attendance at the pre-arranged site visit and the pre-tender meeting will not be a cause for disqualification of a Tenderer.

8. Amendment of Tender Documents

8.1 At any time prior to the deadline for submission of Tenders, the Procuring Entity may amend the Tender Documents by issuing addenda.

8.2 Any addendum issued shall be part of the Tender Documents and shall be communicated in writing to all who have obtained the Tender Documents from the Procuring Entity. The Procuring Entity shall also promptly publish the addendum on the Procuring Entity's website in accordance with ITT 7.5.

8.3 To give Tenderers reasonable time in which to take an addendum into account in preparing their Tenders, the Procuring Entity should extend the deadline for the submission of Tenders, pursuant to ITT 22.2.

C. PREPARATION OF TENDERS

9. Cost of Tendering

The Tenderer shall meet all costs associated with the preparation and submission of its Tender, and the Procuring Entity shall not be responsible or liable for those costs, regardless of the conduct or outcome of the tendering process.

10. Language of Tender

The Tender, as well as all correspondence and documents relating to the tender exchanged by the tenderer and the Procuring Entity, shall be written in the English Language. Supporting documents and printed literature that are part of the Tender may be in another language provided they are accompanied by an accurate and notarized translation of the relevant passages into the English Language**,** in which case, for purposes of interpretation of the Tender, such translation shall govern.

11. Documents Comprising the Tender

11.1 The Tender shall comprise the following:

a) Form of Tender prepared in accordance with ITT 12;
b) Schedules including priced Bill of Quantities, completed inaccordance with ITT 12 and ITT 14;
c) Tender Security or Tender-Securing Declaration, in accordance with ITT 19.1;
d) Alternative Tender, if permissible, in accordance with ITT 13;
e) Authorization: written confirmation authorizing the signatory of the Tender to commit the Tenderer, in accordance with ITT 20.3;
f) Qualifications: documentary evidence in accordance with ITT 17 establishing the Tenderer's qualifications to perform the Contract if its Tender is accepted;
g) Conformity: a technical proposal in accordance with ITT 16;
h) Any other document required in the **TDS**.

11.2 In addition to the requirements under ITT 11.1, Tenders submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful Tender shall be signed by all members and submitted with the Tender, together with a copy of the proposed JV Agreement. Change of membership and conditions of the JV prior to contract signature will render the tender liable for disqualification.

12. Form of Tender and Schedules

12.1 The Form of Tender and Schedules, including the Bill of Quantities*,* shall be prepared using the relevant form*s* furnished in Section IV, Tendering Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITT 20.3. All blank spaces shall be filled in with the information requested. The Tenderer shall chronologically serialize all pages of the tender documents submitted.

12.2 The Tenderer shall furnish in the Form of Tender information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Tender.

13. Alternative Tenders

13.1 Unless otherwise specified in the TDS, alternative Tenders shall not be considered.

13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the **TDS**, and the method of evaluating different alternative times for completion will be described in Section III, Evaluation and Qualification Criteria.

13.3 Except as provided under ITT13.4 below, Tenderers wishing to offer technical alternatives to the requirements of the Tender Documents must first price the Procuring Entity's design as described in the Tender Documents and shall further provide all information necessary for a complete evaluation of the alternative by the Procuring Entity, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the Tenderer with the Winning Tender conforming to the basic technical requirements shall be considered by the Procuring Entity.

13.4 When specified in the **TDS**, Tenderers are permitted to submit alternative technical solutions for specified parts of the Works, and such parts will be identified in the **TDS**, as will the method for their evaluating, and described in Section VII, Works' Requirements.

14. Tender Prices and Discounts

14.1 The prices and discounts (including any price reduction) quoted by the Tenderer in the Form of Tender and in the Bill of Quantities shall conform to the requirements specified below.

14.2 The Tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Tenderer shall be deemed covered by the rates for other items in the Bill of Quantities and will not be paid for separately by the Procuring Entity. An item not listed in the priced Bill of Quantities shall be assumed to be not included in the Tender, and provided that the Tender is determined substantially responsive notwithstanding this omission, the average price of the item quoted by substantially responsive Tenderers will be added to the Tender price and the equivalent total cost of the Tender so determined will be used for price comparison.

14.3 The price to be quoted in the Form of Tender, in accordance with ITT 12, shall be the total price of the Tender, including any discounts offered.

14.4 The Tenderer shall quote any discounts and the methodology for their application in the Form of Tender, in accordance with ITT 12

14.5 It will be specified in the **TDS** if the rates and prices quoted by the Tenderer are or are not subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract, except in cases where the contract is subject to fluctuations and adjustments, not fixed price. In such a case, the Tenderer shall furnish the indices and weightings for the price adjustment formulae in the Schedule of Adjustment Data and the Procuring Entity may require the Tenderer to justify its proposed indices and weightings.

14.6 Where tenders are being invited for individual lots (contracts) or for any combination of lots (packages), tenderers wishing to offer discounts for the award of more than one Contract shall specify in their Tender the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Discounts shall be submitted in accordance with ITT 14.4, provided the Tenders for all lots (contracts) are opened at the same time.

14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 30 days prior to the deadline for submission of Tenders, shall be included in the rates and prices and the total Tender Price submitted by the Tenderer.

14.8 The candidate who wins this tender shall pay a Public Procurement Capacity Building Levy of 0.03% of the value of signed contract. The levy shall be deducted from the contract value by the Procuring Entity and paid to Public Procurement Regulatory Authority (PPRA) at the time of payment of the contract.

15. Currencies of Tender and Payment

15.1 The currency (ies) of the Tender and the currency (ies) of payments shall be the same**.**

15.2 Tenderers shall quote entirely in Kenya Shillings. The unit rates and the prices shall be quoted by the Tenderer in the Bill of Quantities, entirely in Kenya shillings

a) A Tenderer expecting to incur expenditures in other currencies for inputs to the Works supplied from outside Kenya (referred to as "the foreign currency requirements") shall (if so allowed in the **TDS**) indicate in the Appendix to Tender the percentage(s) of the Tender Price (excluding Provisional Sums), needed by the Tenderer for the payment of such foreign currency requirements, limited to no more than two foreign currencies.

b) The rates of exchange to be used by the Tenderer in arriving at the local currency equivalent and the percentage(s) mentioned in (a) above shall be specified by the Tenderer in the Appendix to Tender and shall be based on the exchange rate provided by the Central Bank of Kenya on the date 30 days prior to the actual date of tender opening. Such exchange rate shall apply for all foreign payments under the Contract.

15.3 Tenderers may be required by the Procuring Entity to justify, to the Procuring Entity's satisfaction, their local and foreign currency requirements, and to substantiate that the amounts included in the unit rates and prices and shown in the Schedule of Adjustment Data in the Appendix to Tender are reasonable, in which case a detailed breakdown of the foreign currency requirements shall be provided by Tenderers.

16. Documents Comprising the Technical Proposal

The Tenderer shall furnish a technical proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section IV, Tender Forms, in sufficient detail to demonstrate the adequacy of the Tenderer's proposal to meet the work's requirements and the completion time.

17. Documents Establishing the Eligibility and Qualifications of the Tenderer

17.1 Tenderers shall complete the Form of Tender, included in Section IV, Tender Forms, to establish Tenderer's eligibility in accordance with ITT 4.

17.2 In accordance with Section III, Evaluation and Qualification Criteria, to establish its qualifications to perform the Contract the Tenderer shall provide the information requested in the corresponding information sheets included in Section IV, Tender Forms.

17.3 If a margin of preference applies as specified in accordance with ITT33. 1, national tenderers, individually or in joint ventures, applying for eligibility for national preference shall supply all information required to satisfy the criteria for eligibility specified in accordance with ITT 33.1.

17.4 Tenderers shall be asked to provide, as part of the data for qualification, such information, including details of ownership, as shall be required to determine whether, according to the classification established by the Procuring Entity, a particular contract or or group of contractors qualifies for a margin of preference. Further the information will enable the Procuring Entity identify any actual or potential conflict of interest in relation to the procurement and/or contract management processes, or a possibility of collusion between tenderers, and thereby help to prevent any corrupt influence in relation to the procurement process or contract management.

17.5 The purpose of the information described **in ITT 17.2** above over-rides any claims to confidentiality which a tenderer may have. There can be no circumstances in which it would be justified for a tenderer to keep information relating to its ownership and control confidential where it is tendering to undertake public sector work and receive public sector funds. Thus, confidentiality will not be accepted by the Procuring Entity as a justification for a Tenderer's failure to disclose, or failure to provide required information on its ownership and control.

17.6 The Tenderer shall provide further documentary proof, information or authorizations that the Procuring Entity may request in relation to ownership and control which information on any changes to the information which was provided by the tenderer under ITT 6.4. The obligations to require this information shall continue for the duration of the procurement process and contract performance and after completion of the contract, if any change to the information previously provided may reveal a conflict of interest in relation to the award or management of the contract.

17.7 All information provided by the tenderer pursuant to these requirements must be complete, current and accurate as at the date of provision to the Procuring Entity. In submitting the information required pursuant to these requirements, theTenderer shall warrant that the information submitted is complete, current and accurate as at the date of submission to the Procuring Entity.

17.8 If a tenderer fails to submit the information required by these requirements, its tenderer will be rejected. Similarly, if the Procuring Entity is unable, after taking reasonable steps, to verify to a reasonable degree the information submitted by a tenderer pursuant to these requirements, then the tender will be rejected.

17.9 If information submitted by a tenderer pursuant to these requirements, or obtained by the Procuring Entity (whether through its own enquiries, through notification by the public or otherwise), shows any conflict of interest which could materially and improperly benefit the tenderer in relation to the procurement or contract management process, then:

i) If the procurement process is still on going, the tenderer will be disqualified from the procurement process,
ii) If the contract has been awarded to that tenderer, the contract award will be set aside,
iii) The tenderer will be referred to the relevant law enforcement authorities for investigation of whether the tenderer or any other persons have committed any criminal offence.

17.10 If a tenderer submits information pursuant to these requirements that is incomplete, inaccurate or out-of-date, or attempts to obstruct the verification process, then the consequences ITT 17.8 will ensue unless the tenderer can show to the reasonable satisfaction of the Procuring Entity that any such act was not material, or was due to genuine error which was not attributable to the intentional act, negligence or recklessness of the tender.

18. Period of Validity of Tenders

18.1. Tenders shall remain valid for the Tender Validity period specified in the **TDS**. The Tender Validity period starts from the date fixed for the Tender submission deadline (as prescribed by the Procuring Entity in accordance with ITT 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 the expiration of the Tender validity period, the Procuring Entity may request Tenderers to extend the period of validity of their Tenders. The request and the responses shall be made in writing. If a tender Security is requested in accordance with ITT 19, it shall also be extended for thirty (30) days beyond the deadline of the extended validity period. A Tenderer may refuse the request without forfeiting its Tender security. A Tenderer granting their quest shall not be required or permitted to modify its Tender.

19. Tender Security

19.1 The Tenderer shall furnish as part of its Tender, either a Tender-Securing Declaration or a Tender Security as specified in the **TDS**, in original form and, in the case of a tender Security, in the amount and currency **specified in the TDS**. A Tender-Securing Declaration shall use the form included in Section IV, Tender Forms.

19.2 If a tender Security is specified pursuant to ITT19.1, the Tender Security shall be a demand guarantee in any of the following forms at the Tenderer's option:
i) cash;
ii) a bank guarantee;
iii) a guarantee by an insurance company registered and licensed by the Insurance Regulatory Authority listed by the Authority; or
iv) a guarantee issued by a financial institution approved and licensed by the Central Bank of Kenya, from a reputable source, and an eligible country.

19.3 If an unconditional bank guarantee is issued by a bank located outside Kenya, the issuing bank shall have a correspondent bank located in Kenya to make it enforceable. The Tender Security shall be valid for thirty (30) days beyond the original validity period of the Tender, or beyond any period of extension if requested under ITT 18.2.

19.4 If a Tender Security or Tender-Securing Declaration is specified pursuant to ITT 19.1, any Tender not accompanied by a substantially responsive Tender Security or Tender-Securing Declaration shall be rejected by the Procuring Entity as non-responsive.

19.5 If a Tender Security is specified pursuant to ITT 19.1, the Tender Security of unsuccessful Tenderers shall be returned as promptly as possible upon the successful Tenderer's signing the Contract and furnishing the Performance Security and any other documents required in the **TDS**.The Procuring Entity shall also promptly return the tender security to the tenderers where the procurement proceedings are terminated, all tenders were determined non-responsive or a bidder declines to extend tender validity period.

19.6 The Tender Security of the successful Tenderer shall be returned as promptly as possible once the successful Tenderer has signed the Contract and furnished the required Performance Security, and any other documents required in the **TDS**.

19.7 The Tender Security may be forfeited or the Tender-Securing Declaration executed:
a) if a Tenderer withdraws its Tender during the period of Tender validity specified by the Tenderer on the Form of Tender, or any extension there to provided by the Tenderer; or
b) if the successful Tenderer fails to:
i) sign the Contract in accordance with ITT 47; or
ii) furnish a Performance Security and if required in the **TDS**, and any other documents required in the **TDS.**

19.8 Where tender securing declaration is executed, the Procuring Entity shall recommend to the PPRA that PPRA debars the Tenderer from participating in public procurement as provided in the law.

19.9 The Tender Security or the Tender-Securing Declaration of a JV shall be in the name of the JV that submits the Tender. If the JV has not been legally constituted into a legally enforceable JV at the time of tendering, the Tender Security or the Tender-Securing Declaration shall be in the names of all future members as named in the letter of intent referred to in ITT 4.1 and ITT 11.2.

19.10 A tenderer shall not issue a tender security to guarantee itself.

20. Format and Signing of Tender

20.1 The Tenderer shall prepare one original of the documents comprising the Tender as described in ITT 11 and clearly mark it "ORIGINAL." Alternative Tenders, if permitted in accordance with ITT 13, shall be clearly marked "ALTERNATIVE." In addition, the Tenderer shall submit copies of the Tender, in the number **specified in the TDS** and clearly mark them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

20.2 Tenderers shall mark as "CONFIDENTIAL" all information in their Tenders which is confidential to their business. This may include proprietary information, trade secrets, or commercial or financially sensitive information.

20.3 The original and all copies of the Tender shall be typed or written in indelible ink and shall besigned by a person duly authorized to sign on behalf of the Tenderer. This authorization shall consist of a written confirmation as specified in the **TDS** and shall be attached to the Tender. The name and position held bye ach person signing the authorization must be typed or printed below the signature. All pages of the Tender where entries or amendments have been made shall be signed or initialized by the person signing the Tender.

20.4 In case the Tenderer is a JV, the Tender shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.

20.5 Any inter-lineation, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Tender.

D. SUBMISSION AND OPENING OF TENDERS

21. Sealing and Marking of Tenders

21.1 The Tenderer shall deliver the Tender in a single sealed envelope, or in a single sealed package, or in a single sealed container bearing the name and Reference number of the Tender, addressed to the Procuring Entity and a warning not to open before the time and date for Tender opening date. Within the single envelope, package or container, the Tenderer shall place the following separate, sealed envelopes:

a) in an envelope or package or container marked "ORIGINAL", all documents comprising the Tender, as describedinITT11; and
b) in an envelope or package or container marked "COPIES" all required copies of the Tender; and
c) if alternative Tenders are permitted in accordance with ITT 13, and if relevant:
   i) in an envelope or package or container marked "ORIGINAL - ALTERNATIVE TENDER", the alternative Tender; and
   ii) in the envelope or package or container marked "COPIES-ALTERNATIVETENDER", all required copies of the alternative Tender.

The inner envelopes or packages or containers shall:
a) Bear the name and address of the Procuring Entity.
b) Bear the name and address of the Tenderer; and
c) Bear the name and Reference number of the Tender.

21.2 If an envelope or package or container is not sealed and marked as required, the *Procuring Entity* will assume no responsibility for the misplacement or premature opening of the Tender. Tenders that were misplaced or opened prematurely will not be accepted.

22. Deadline for Submission of Tenders

22.1 Tenders must be received by the Procuring Entity at the address specified in the **TDS** and no later than the date and time also specified in the **TDS.** When so specified in the **TDS**, Tenderers shall have the option of submitting their Tenders electronically. Tenderers submitting Tenders electronically shall follow the electronic Tender submission procedures specified in the **TDS**.

22.2 The Procuring Entity may, at its discretion, extend the deadline for the submission of Tenders by amending the Tender Documents in accordance with ITT 8, in which case all rights and obligations of the Procuring Entity and Tenderers previously subject to the deadline shall thereafter be subject to the deadline as extended.

23. Late Tenders

The Procuring Entity shall not consider any Tender that arrives after the deadline for submission of tenders, in accordance with ITT 22. 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. Withdrawal, Substitution, and Modification of Tenders

24.1 A Tenderer may withdraw, substitute, or modify its Tender after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITT 20.3, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Tender must accompany the respective written notice. All notices must be:

a) prepared and submitted in accordance with ITT 20 and ITT 21 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked "WITHDRAWAL," "SUBSTITUTION," "MODIFICATION;" and

b) received by the Procuring Entity prior to the deadline prescribed for submission of Tenders, in accordance with ITT 22.

24.2 Tenders requested to be withdrawn in accordance with ITT 24.1 shall be returned unopened to the Tenderers.

24.3 No Tender may be withdrawn, substituted, 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 Form of Tender or any extension thereof.

25. Tender Opening

25.1 Except in the cases specified in ITT 23 and ITT 24.2, the Procuring Entity shall publicly open and read out all Tenders received by the deadline, at the date, time and place specified **in the TDS**, in the presence of Tenderers' designated representatives and anyone who chooses to attend. Any specific electronic Tender opening procedures required if electronic Tendering is permitted in accordance with ITT 22.1, shall be as specified in the **TDS.**

25.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelopes with the corresponding Tender shall not be opened but returned to the Tenderer. No Tender withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out attender opening.

25.3 Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding Tender being substituted, and the substituted Tender shall not be opened, but returned to the Tenderer. No Tender substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Tender opening.

25.4 Next, envelopes marked "MODIFICATION" shall be opened and read out with the corresponding Tender. No Tender modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Tender opening.

25.5 Next, all remaining envelopes shall be opened one at a time, reading out: the name of the Tenderer and whether there is a modification; the total Tender Price, per lot (contract) if applicable, including any discounts and alternative Tenders; the presence or absence of a Tender Security or Tender-Securing Declaration, if required; and any other details as the Procuring Entity may consider appropriate.

25.6 Only Tenders, alternative Tenders and discounts that are opened and read out at Tender opening shall be considered further for evaluation. The Form of Tender and pages of the Bill of Quantities (to be decided on by the tender opening committee) are to be initialed by the members of the tender opening committee attending the opening.

25.7 At the Tender Opening, the Procuring Entity shall neither discuss the merits of any Tender nor reject any Tender (except for late Tenders, in accordance with ITT 23.1).

25.8 The Procuring Entity shall prepare minutes of the Tender Opening that shall include, as a minimum:

a) The name of the Tenderer and whether there is a withdrawal, substitution, or modification;
b) The Tender Price, per lot (contract) if applicable, including any discounts;
c) Any alternative Tenders;
d) The presence or absence of a Tender Security, if one was required.
e) Number of pages of each tender document submitted.

25.9 The Tenderers' representatives who are present shall be requested to sign the minutes. The omission of a Tenderer's signature on the minutes shall not invalidate the contents and effect of the minutes. A copy of tender opening register shall be issued to a tenderer upon request.

E. Evaluation and Comparison of Tenders

26. Confidentiality

26.1 Information relating to the evaluation of Tenders and recommendation of contract award shall not be disclosed to Tenderers or any other persons not officially concerned with the Tender process until information on Intention to Award the Contract is transmitted to all Tenderers in accordance with ITT 43.

26.2 Any effort by a Tenderer to influence the Procuring Entity in the evaluation of the Tenders or Contract award decisions may result in the rejection of its tender.

26.3 Notwithstanding ITT 26.2, from the time of tender opening to the time of contract award, if a tenderer wishes to contact the Procuring Entity on any matter related to the tendering process, it shall do so in writing.

27. Clarification of Tenders

27.1 To assist in the examination, evaluation, and comparison of the tenders, and qualification of the tenderers, the Procuring Entity may, at its discretion, ask any tenderer for a clarification of its tender, given a reasonable time for a response. Any clarification submitted by a tenderer that is not in response to a request by the Procuring Entity shall not be considered. The Procuring Entity's request for clarification and the response shall be in writing. No change, including any voluntary increase or decrease, 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 the tenders, in accordance with ITT 31.

27.2 If a tenderer does not provide clarifications of its tender by the date and time set in the Procuring Entity's request for clarification, its Tender may be rejected.

28. Deviations, Reservations, and Omissions

28.1 During the evaluation of tenders, the following definitions apply:

a) “Deviation” is a departure from the requirements specified in the tender document;
b) “Reservation” is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the tender document; and
c) “Omission” is the failure to submit part or all of the information or documentation required in the Tender document.

29. Determination of Responsiveness

29.1 The Procuring Entity's determination of a Tender's responsiveness is to be based on the contents of the tender itself, as defined in ITT 11.

29.2 A substantially responsive Tender is one that meets the requirements of the Tender document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that, if accepted, would:

a) Affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or

b) limit in any substantial way, inconsistent with the tender document, the Procuring Entity's rights or the tenderer's obligations under the proposed contract; or

c) if rectified, would unfairly affect the competitive position of other tenderers presenting substantially responsive tenders.

29.3 The Procuring Entity shall examine the technical aspects of the tender submitted in accordance with ITT 16, to confirm that all requirements of Section VII, Works' Requirements, have been met without any material deviation, reservation or omission.

29.4 If a tender is not substantially responsive to the requirements of the tender document, it shall be rejected by the Procuring Entity and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

30. Non-material non-conformities

30.1 Provided that a tender is substantially responsive, the Procuring Entity may waive any non-conformities in the tender.

30.2 Provided that a Tender is substantially responsive, the Procuring Entity may request that the tenderer submit the necessary information or documentation, within a reasonable period, to rectify non-material non-conformities in the tender related to documentation requirements. Requesting information or documentation on such non-conformities shall not be related to any aspect of the price of the tender. Failure of the tenderer to comply with the request may result in the rejection of its tender.

30.3 Provided that a tender is substantially responsive, the Procuring Entity shall rectify quantifiable non-material non-conformities related to the Tender Price. To this effect, the Tender Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component in the manner specified **in the TDS.**

31. Arithmetical Errors

31.1 The tender sum as submitted and read out during the tender opening shall be absolute and final and shall not be the subject of correction, adjustment or amendment in any way by any person or entity.

31.2 Provided that the Tender is substantially responsive, the Procuring Entity shall handle errors on the following basis:

a) Any error detected if considered a major deviation that affects the substance of the tender, shall lead to disqualification of the tender as non-responsive.

b) Any errors in the submitted tender arising from a miscalculation of unit price, quantity, subtotal and total bid price shall be considered as a major deviation that affects the substance of the tender and shall lead to disqualification of the tender as non-responsive. and

c) If there is a discrepancy between words and figures, the amount in words shall prevail

31.3 Tenderers shall be notified of any error detected in their bid during the notification of award.

32. Conversion to Single Currency

For evaluation and comparison purposes, the currency (ies) of the Tender shall be converted into a single currency **as specified in the TDS**.

33. Margin of Preference and Reservations

33.1 A margin of preference may be allowed only when the contract is open to international competitive tendering where foreign contractors are expected to participate in the tendering process and where the contract exceeds the value/threshold specified in the Regulations.

33.2 A margin of preference shall not be allowed unless it is specified so in the **TDS**.

33.3 Contracts procured on basis of international competitive tendering shall not be subject to reservations exclusive to

specific groups as provided in ITT 33.4.

33.4 Where it is intended to reserve a contract to a specific group of businesses (these groups are Small and Medium Enterprises, Women Enterprises, Youth Enterprises and Enterprises of persons living with disability, as the case may be), and who are appropriately registered as such by the authority to be specified in the **TDS**, a procuring entity shall ensure that the invitation to tender specifically indicates that only businesses or firms belonging to the specified group are eligible to tender. No tender shall be reserved to more than one group. If not so stated in the Invitation to Tender and in the Tender documents, the invitation to tender will be open to all interested tenderers.

34. Nominated Subcontractors

34.1 **Unless** otherwise stated **in the TDS,** the Procuring Entity does not intend to execute any specific elements of the Works by subcontractors selected/nominated by the Procuring Entity. In case the Procuring Entity nominates a sub-contractor, the subcontract agreement shall be signed by the Subcontractor and the Procuring Entity. The main contract shall specify the working arrangements between the main contractor and the nominated subcontractor.

34.2 Tenderers may propose subcontracting up to the percentage of total value of contracts or the volume of works as specified **in the TDS**. Subcontractors proposed by the Tenderer shall be fully qualified for their parts of the Works.

34.3 Domestic subcontractor's qualifications shall not be used by the Tenderer to qualify for the Works unless their specialized parts of the Works were previously designated so by the Procuring Entity **in the TDS** as can be met by subcontractors referred to hereafter as 'Specialized Subcontractors', in which case, the qualifications of the Specialized Subcontractors proposed by the Tenderer may be added to the qualifications of the Tenderer.

35. Evaluation of Tenders

35.1 The Procuring Entity shall use the criteria and methodologies listed in this ITT and Section III, Evaluation and Qualification Criteria. No other evaluation criteria or methodologies shall be permitted. By applying the criteria and methodologies the Procuring Entity shall determine the Lowest Evaluated Tender in accordance with ITT 40.

35.2 To evaluate a Tender, the Procuring Entity shall consider the following:

a) Price adjustment in accordance with ITT 31.1; excluding provisional sums and contingencies, if any, but including Day work items, where priced competitively;
b) Price adjustment due to discounts offered in accordance with ITT 14.4;
c) converting the amount resulting from applying (a) and (b) above, if relevant, to a single currency in accordance with ITT 32;
d) price adjustment due to quantifiable non-material non-conformities in accordance with ITT 30.3; and
e) any additional evaluation factors specified **in the TDS** and Section III, Evaluation and Qualification Criteria.

35.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be considered in tender evaluation.

35.4 Where the tender involves multiple lots or contracts, the tenderer will be allowed to tender for one or more lots (contracts). Each lot or contract will be evaluated in accordance with ITT 35.2. The methodology to determine the lowest evaluated tenderer or tenderers based one lot (contract) or based on a combination of lots (contracts), will be specified in Section III, Evaluation and Qualification Criteria. In the case of multiple lots or contracts, tenderer will be required to prepare the Eligibility and Qualification Criteria Form for each Lot.

36. Comparison of Tenders

The Procuring Entity shall compare the evaluated costs of all substantially responsive Tenders established in accordance with ITT 35.2 to determine the Tender that has the lowest evaluated cost.

37. Abnormally Low Tenders and Abnormally High Tenders

Abnormally Low Tenders

37.1 An Abnormally Low Tender is one where the Tender price, in combination with other elements of the Tender, appears so low that it raises material concerns as to the Tenderer in regards to the Tenderer's ability to perform the Contract for the offered Tender Price or that genuine competition between Tenderers is compromised.

37.2 In the event of identification of a potentially Abnormally Low Tender, the Procuring Entity shall seek written clarifications from the Tenderer, including detailed price analyses of its Tender price in relation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the Tender document.

37.3 After evaluation of the price analyses, in the event that the Procuring Entity determines that the Tenderer has failed to demonstrate its capability to perform the Contract for the offered Tender Price, the Procuring Entity shall reject the Tender.

Abnormally High Tenders

37.4 An abnormally high tender price is one where the tender price, in combination with other constituent elements of the Tender, appears unreasonably too high to the extent that the Procuring Entity is concerned that it (the Procuring Entity) may not be getting value for money or it may be paying too high a price for the contract compared with market prices or that genuine competition between Tenderers is compromised.

37.5 Incase of an abnormally high price, the Procuring Entity shall make a survey of the market prices, check if the estimated cost of the contract is correct and review the Tender Documents to check if the specifications, scope of work and conditions of contract are contributory to the abnormally high tenders. The Procuring Entity may also seek written clarification from the tenderer on the reason for the high tender price. The Procuring Entity shall proceed as follows:

i) If the tender price is abnormally high based on wrong estimated cost of the contract, the Procuring Entity may accept or not accept the tender depending on the Procuring Entity's budget considerations.

ii) If specifications, scope of work and/or conditions of contract are contributory to the abnormally high tender prices, the Procuring Entity shall reject all tenders and may retender for the contract based on revised estimates, specifications, scope of work and conditions of contract, as the case may be.

37.6 If the Procuring Entity determines that the Tender Price is abnormally too high because genuine competition between tenderers is compromised (*often due to collusion, corruption or other manipulations*), the Procuring Entity shall reject all Tenders and shall institute or cause competent Government Agencies to institute an investigation on the cause of the compromise, before retendering.

38. Unbalanced and/or Front-Loaded Tenders

38.1 If in the Procuring Entity's opinion, the Tender that is evaluated as the lowest evaluated price is seriously unbalanced and/or front loaded, the Procuring Entity may require the Tenderer to provide written clarifications. Clarifications may include detailed price analyses to demonstrate the consistency of the tender prices with the scope of works, proposed methodology, schedule and any other requirements of the Tender document.

38.2 After the evaluation of the information and detailed price analyses presented by the Tenderer, the Procuring Entity may as appropriate:

a) accept the Tender; or

b) require that the total amount of the Performance Security be increased at the expense of the Tenderer to a level not exceeding a **10%** of the Contract Price; or

c) agree on a payment mode that eliminates the inherent risk of the Procuring Entity paying too much for undelivered works; or

d) reject the Tender,

39. Qualifications of the Tenderer

39.1 The Procuring Entity shall determine to its satisfaction whether the eligible Tenderer that is selected as having submitted the lowest evaluated cost and substantially responsive Tender, meets the qualifying criteria specified in Section III, Evaluation and Qualification Criteria.

39.2 The determination shall be based upon an examination of the documentary evidence of the Tenderer's qualifications submitted by the Tenderer, pursuant to ITT 17. The determination shall not take into consideration the qualifications of other firms such as the Tenderer's subsidiaries, parent entities, affiliates, subcontractors (other than Specialized Subcontractors if permitted in the Tender document), or any other firm(s) different from the Tenderer.

39.3 An affirmative determination shall be a prerequisite for award of the Contract to the Tenderer. A negative determination shall result in disqualification of the Tender, in which event the Procuring Entity shall proceed to the Tenderer who offers a substantially responsive Tender with the next lowest evaluated price to make a similar determination of that Tenderer's qualifications to perform satisfactorily.

40. Lowest Evaluated Tender

Having compared the evaluated prices of Tenders, the Procuring Entity shall determine the Lowest Evaluated Tender. The Lowest Evaluated Tender is the Tender of the Tenderer that meets the Qualification Criteria and whose Tender has been determined to be:

a) Most responsive to the Tender document; and
b) The lowest evaluated price.

41. Procuring Entity's Right to Accept Any Tender, and to Reject Any or All Tenders.

The Procuring Entity reserves the right to accept or reject any Tender and to annul the Tender process and reject all Tenders at any time prior to Contract Award, without incurring any liability to Tenderers. In case of annulment, all Tenders submitted and specifically, Tender securities, shall be promptly returned to the Tenderers.

F. AWARD OF CONTRACT

42. Criteria Award

The Procuring Entity shall award the Contract to the successful tenderer whose tender has been determined to be the Lowest Evaluated Tender.

43. Notice of Intention to enter into a Contract

Upon award of the contract and prior to the expiry of the Tender Validity Period the Procuring Entity shall issue a Notification of Intention to Enter into a Contract/Notification of award to all tenderers which shall contain, at a minimum, the following information:

a) the name and address of the Tenderer submitting the successful tender;
b) the Contract price of the successful tender;
c) a statement of the reason(s) the tender of the unsuccessful tenderer to whom the letter is addressed was unsuccessful, unless the price information in (b) above already reveals the reason;
d) the expiry date of the Standstill Period; and
e) instructions on how to request a debriefing and/or submit a complaint during the stand still period;

44. Stand still Period

44.1 The Contract shall not be signed earlier than the expiry of a Standstill Period of 10 days to allow any dissatisfied tender to launch a complaint. Where only one Tender is submitted, the Standstill Period shall not apply.

44.2 Where a Standstill Period applies, it shall commence when the Procuring Entity has transmitted to each Tenderer the Notification of Intention to Enter into a Contract with the successful Tenderer.

45. Debriefing by the Procuring Entity

45.1 On receipt of the Procuring Entity's Notification of Intention to Enter into a Contract referred to in ITT 43, an unsuccessful tenderer may make a concerns regarding their tender. The Procuring Entity shall provide the debriefing within five days of receipt of the request.

45.2 Debriefings of unsuccessful Tenderers may be done in writing or verbally. The Tenderer shall bear its own costs of attending such a debriefing meeting.

46. Letter of Award

Prior to the expiry of the Tender Validity Period and upon expiry of the Standstill Period specified in ITT 44.1, upon

addressing a complaint that has been filed within the Standstill Period, the Procuring Entity shall transmit the Letter of Award to the successful Tenderer. The letter of award shall request the successful tenderer to furnish the Performance Security within 21 days of the date of the letter.

47. Signing of Contract

47.1 Upon the expiry of the fourteen days of the Notification of Intention to enter into contract and upon the parties meeting their respective statutory requirements, the Procuring Entity shall send the successful Tenderer the Contract Agreement.

47.2 Within fourteen (14) days of receipt of the Contract Agreement, the successful Tenderer shall sign, date, and return it to the Procuring Entity.

47.3 The written contract shall be entered into within the period specified in the notification of award and before expiry of the tender validity period.

48. Performance Security

48.1 Within twenty-one (21) days of the receipt of the Letter of Award from the Procuring Entity, the successful Tenderer shall furnish the Performance Security and, any other documents required in the **TDS**, in accordance with the General Conditions of Contract, subject to ITT 38.2 (b), using the Performance Security and other Forms included in Section X, Contract Forms, or another form acceptable to the Procuring Entity. A foreign institution providing a bank guarantee shall have a correspondent financial institution located in Kenya, unless the Procuring Entity has agreed in writing that a correspondent bank is not required.

48.2 Failure of the successful Tenderer to submit the above-mentioned Performance Security and other documents required in the**TDS** or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Tender Security. In that event the Procuring Entity may award the Contract to the Tenderer offering the next Best Evaluated Tender.

48.3 Performance security shall not be required for contracts estimated to cost less than the amount specified in the Regulations.

49. Publication of Procurement Contract

Within fourteen days after signing the contract, the Procuring Entity shall publish the awarded contract at its notice boards and websites; and on the Website of the Authority. At the minimum, the notice shall contain the following information:

a) name and address of the Procuring Entity;

b) name and reference number of the contract being awarded, a summary of its scope and the selection method used;

c) the name of the successful Tenderer, the final total contract price, the contract duration.

d) dates of signature, commencement and completion of contract;

e) names of all Tenderers that submitted Tenders, and their Tender prices as read out at Tender opening.

50. Procurement Related Complaint and Administrative Review

50.1 The procedures for making Procurement-related Complaints shall be specified in the **TDS.**

50.2 A request for administrative review shall be made in the form provided under contract forms.

Section II - Tender Data Sheet (TDS)

The following specific data shall complement, supplement, or amend the provisions in the Instructions to Tenderers (ITT). Whenever there is a conflict, the provisions herein shall prevail over those in ITT.

Reference to ITC Clause	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS
A. General	
ITT 1.1	The name of the contract is: Construction works for Kiamucuku Water Supply Project in Kirinyaga County and the identified paintings at TWWDA Offices. (Reserved For Firms Owned by Women) The reference number of the Contract is: TWWDA/T/005/2025 - 2026 The number and identification of lots (contracts) comprising this Tender are *[insert number and identification of lots (contracts)]* Lot 1- Name _____N/A_____ Lot 2- Name _____N/A_____ Lot… Name _____N/A_____ ETC
ITT 2.4	The Information made available on competing firms is as follows: N/A
ITT 2.4	The firms that provided consulting services for the contract being tendered for are: N/A
ITT3.12	The NCA registration certificate to be required before award and signing of the contract shall be of category: Water **Works NCA 7** and above.
ITT 3.1	Maximum number of members in the Joint Venture (JV) shall be: ***[N/A].***
B. Contents of Tender Document	
ITT 6.1	All documents referred to under section 6.1, shall form part of the contract and must all be submitted having been chronologically paginated as had been uploaded in the Blank tender document and stamped on every page.
ITT 7.1	(i) The Tenderer will submit any request for clarifications in writing at the Address: P.O. Box 1292-10100 Nyeri, to reach the Procuring Entity not later than **Thursday 07th May, 2026** Prior to deadline for submission of Tenders (ii) The Procuring Entity will publish its response on its website: www.tanawwda.go.ke
ITT 7.2	(A) A pre-arranged pretender site visit **Shall** take place at the following date, time and place: Date: Wednesday 06th May 2026 Time: 10:00 am Place: Tana Water Works Development Agency in Nyeri Town, along Baden Powell Road. (B) Pre-Tender meeting *["shall not"]* take place at the following date, time and place: Date: _____**N/A**_____ Time: N/A Place: _____
ITT 7.3	The Tenderer will submit any questions in writing, to reach the Procuring Entity not

Reference to ITC Clause	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS
	later than **N/A** before the meeting.
ITT 7.5	The Procuring Entity's website where Minutes of the pre-Tender meeting and the pre-arranged pretender site visit will be published is: **www.tanawwda.go.ke**

C. Preparation of Tenders	
ITT 11(a)	The Tenderer shall submit the following additional documents in its Tender: Current and Valid Registration as a **minimum Class 'D'** and above licensed water supply and sewerage contractor registered with the Ministry of Water, Sanitation and Irrigation and any other *indicated in the section under S**ection III – Evaluation and Qualification Criteria.***
ITT 13(a)	Alternative Tenders ***"shall not be"*** considered.
ITT 13(b)	Alternative times for completion ***"shall not be"*** permitted.
ITT 13(d)	Alternative technical solutions shall be permitted for the following parts of the Works: **NA**
ITT 14(e)	The prices quoted by the Tenderer shall be: "***fixed"***
ITT 14(g)	0.03% of the contract value to be deducted from the total amount payable to the contracted firm and submitted to PPRA
ITT 15(b)	Foreign currency requirements **not allowed.**
ITT 18.2	The Tender validity period shall be 182 days.
ITT 18.3	a) The Number of days beyond the expiry of the initial tender validity period will be days: **N/A** (b) The Tender price shall be adjusted by the following percentages of the tender price: **N/A** (i) By - % of t*he local currency portion of the Contract price adjusted to reflect local inflation during the period of extension, and: **N/A*** (ii) *By - % the foreign currency portion of the Contract price adjusted to reflect the international inflation during the period of extension: **N/A***
ITT 19(a)	A duly filled Tender-Securing Declaration form *"shall be*" required The amount and currency of the Tender Security shall be: NA

Reference to ITC Clause	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS

ITT 19(e)	Other documents required are: NCA Registration certificate, Contractor`s all risk insurance policies (Works, Plant and Equipment), Third-party Insurance, WIBA or GPA_____
ITT 20(a)	In addition to the original of the Tender, the number of copies is: **1 copy**
ITT 20(c)	The written confirmation of authorization to sign on behalf of the Tenderer shall consist of: **Power of Attorney**
D. Submission and Opening of Tenders	
ITT 21(a)	A tender package or container that cannot fit in the tender box shall be received as follows: **Delivered to the Manager Supply and Chain Management's Office**
ITT 22(a)	(A) For Tender submission purposes only, the Procuring Entity's address is: (1) Name of Procuring Entity: Tana Water Works Development Agency (2) Postal Address: Chief Executive Officer, P.O. Box 1292-10100, Nyeri (3) Physical address for hand Courier Delivery to an office or Tender Box: Nyeri, Baden Powel Road, Maji House, Ground Floor (4) Date and time for submission of Tenders **Thursday, 14th May 2026. 10:00 a.m** (5) Tenderers **shall not submit** tenders electronically.
ITT 25(a)	The Tender opening shall take place at the time and the address for Opening of Tenders provided below: (1) Name of Procuring Entity: Tana Water Works Development Agency (2) Physical address for the location: Nyeri, Baden Powel Road, Maji House State date and time of tender opening **Thursday, 14th May 2026. 10:00 a.m**
ITT 25(a)	If Tenderers are allowed to submit Tenders electronically, they shall follow the electronic tender submission procedures specified below**: N/A**
E. Evaluation, and Comparison of Tenders	
ITT 30(c)	The adjustment shall be based on the *average* price of the item or component as quoted in other substantially responsive Tenders. If the price of the item or component cannot be derived from the price of other substantially responsive Tenders, the Procuring Entity shall use its Lowest estimate.

ITT 31(b)	An error shall be considered a major deviation that leads to disqualification of the tender if the percentage of the error (error over the tender price quoted) is: **more or less than 2.5%.**

Reference to ITC Clause	**PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS**
ITT 32	The currency that shall be used for Tender evaluation and comparison purposes to convert at the selling exchange rate all Tender prices expressed in various currencies into a single currency is: **Kenya Shillings** The source of exchange rate shall be: **The Central bank of Kenya** The date for the exchange rate shall be*:* **the deadline date for Submission of the Tenders.** *For comparison of Tenders, the Tender Price, corrected pursuant to ITT 31, shall first be broken down into the respective amounts payable in various currencies by using the selling exchange rates specified by the Tenderer in accordance with ITT 15.1.* *In the second step, the Procuring Entity will convert the amounts in various currencies in which the Tender Price is payable (excluding Provisional Sums but including Daywork where priced competitively) to the single currency identified above at the selling rates established for similar transactions by the authority specified and, on the date, stipulated above.*
ITT 33(b)	A margin of preference ***"shall not"*** apply.
ITT 33(d)	The invitation to tender is extended to the following groups that qualify for Reservations **N/A**
ITT 34(a)	At this time, the Procuring Entity ``***does not intend"*** to execute certain specific parts of the Works by subcontractors selected in advance.
ITT 34(b)	Contractor's may propose subcontracting: Maximum percentage of subcontracting permitted is: *30% of the total contract amount.* Tenderers planning to subcontract more than 10% of total volume of work shall specify, in the Form of Tender, the activity (ies) or parts of the Works to be subcontracted along with complete details of the subcontractors and their qualification and experience. **Any part of the works sub-contracted should be formally communicated to the Employer before engagement of the Subcontractor**.
ITT 34(c)	*[Indicate N/A if not applicable]* The parts of the Works for which the Procuring Entity permits Tenderers to propose Specialized Subcontractors are designated as follows: **N/A** For the above-designated parts of the Works that may require Specialized Subcontractors, the relevant qualifications of the proposed Specialized Subcontractors will be added to the qualifications of the Tenderer for the purpose of evaluation.

ITT 35(b) (e)	Additional requirements apply. These are detailed in the evaluation criteria in Section III, Evaluation and Qualification Criteria.
ITT 48(b)	Additional requirements are: Requisite Insurances including All Risk Insurance policies, Third-Party Insurance, Workers Insurance - WIBA or GPA
ITT 50(a)	The procedures for making a Procurement-related Complaint are available from the PPRA website info@ppra.go.ke or complaints@ppra.go.ke. If a Tenderer wishes to make a Procurement-related Complaint, the Tenderer should submit its complaint following these procedures, in writing (by the quickest means available, that is either by hand delivery or email to: For the attention: *Eng. Philip Gichuki, MBS*
Reference to ITC Clause	**PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS**
	Title/position: *Chief Executive Officer* Procuring Entity: *Tana Water Works Development Agency* Email address*: ceo@tanawwda.go.ke* In summary, a Procurement-related Complaint may challenge any of the following: (i) the terms of the Tender Documents; and (ii) the Procuring Entity's decision to award the contract.

SECTION III- EVALUATION AND QUALIFICATION CRITERIA

General Provisions

1. General Provisions

1.1 This section contains the criteria that the Employer shall use to evaluate tender and qualify tenderers. No other factors, methods or criteria shall be used other than specified in this tender document. The Tenderer shall provide all the information requested in the forms included in Section IV, Tendering Forms. The Procuring Entity shall use **the Standard Tender Evaluation Document for Goods and Works** for evaluating Tenders.

1.2 Wherever a Tenderer is required to state a monetary amount, Tenderers should indicate the Kenya Shilling equivalent using the rate of exchange determined as follows:

a) For construction turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year (in which the amount for that year is to be converted) was originally established.
b) Value of single contract - Exchange rate prevailing on the date of the contract signature.
c) Exchange rates shall be taken from the publicly available source identified in the ITT 14.3. Any error in determining the exchange rates in the Tender may be corrected by the Procuring Entity.

1.3 Evaluation and contract award Criteria

Procuring Entity shall use the criteria and methodologies listed in this Section to evaluate tenders and arrive at the Lowest Evaluated Tender. The tender that (i) meets the qualification criteria, (ii) has been determined to be substantially responsive to the Tender Documents, and (iii) is determined to have the Lowest Evaluated Tender price shall be selected for award of contract

1. (i) Preliminary examination for Determination of Responsiveness

The Procuring Entity will start by examining all tenders to ensure they meet in all respects the eligibility criteria and other requirements in the ITT, and that the tender is complete in all aspects in meeting the requirements of "Part 2 – Procuring Entity's Works Requirements", including checking for tenders with unacceptable errors, abnormally low tenders, abnormally high tenders and tenders that are front loaded. The Standard Tender Evaluation Report Document for Goods and Works for evaluating Tenders provides very clear guide on how to deal with review of these requirements. Tenders that do not pass the Preliminary Examination will be considered irresponsive and will not be considered further.

	MANDATORY REQUIREMENTS	**Yes**	**No**	**Remarks (Fail or Pass) at the bottom**
	Submission of valid documents listed below: -			
1.	Copy of Firm's KRA PIN Certificate			
2.	Copy of Certificate of Incorporation/Registration under a valid legal entity.			
3.	Valid Tax Compliance Certificate			
4.	List of Heads of the tendering Entity– Attach copy of a valid CR12 not older than 12 months from the date of tender submission in case of incorporated Companies/or Business Registration Services copy.			
5.	Audited Accounts for the last three years (i.e. within the period of 2021/2022 to 2023/2024			

	which must be signed by the auditor and the directors)			
6.	Evidence/proof of having undertaken at least 3 No. similar works in the last 10 years.			
7.	Duly filled Tender Security Declaration Form as described in the ITT 19.1			
8.	Firm`s profile and resumes of the key staff (Project Manager, Site Agent, Engineering Surveyor, Foreman and Environmentalist)			
9.	Business permit from the respective County Government.			
10.	Tender Document to be signed by a duly authorized person on behalf of the firm as evidenced by a duly registered Power of Attorney			
11.	Bid document MUST be initialled, stamped and chronologically paginated, hard bound, completely filled and countersigned in case of any cancellation			
12.	Copy of a valid NSSF compliance certificate			
13.	Copy of a valid NHIF compliance certificate			
14.	Duly filled and signed attached confidential business questionnaire			
15.	Duly filled, signed and stamped form of tender			
16.	Litigation History sworn by a Commissioner of Oaths.			
17.	Tenderer should not have been debarred by PPRA.			
18.	Duly filled, signed and stamped Tendering forms.			
19.	Registration as a **minimum Class 'D'** and above licensed water supply and sewerage contractor registered with the Ministry of Water, Sanitation and Irrigation.			
20.	A copy of Registration Certificate with **NCA category '7'** and above			
21	Original copy of the Pre-Bid Site Visit Certificate must be attached			
22	A copy of a valid AGPO certificate (Women Category)			
23	Submitted 1 Original and 1 Copy of the Bid Document.			
	REMARKS			

iii) Stage 2- Technical Evaluation

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

2(ii)	**SPECIFIC SPECIFICATIONS**			
		Required Marks	**Awarded Marks**	**Remarks**
2.1	**FIRM'S GENERAL AND SPECIFIC EXPERIENCE**			
	General experience (6 Marks)	**6**		
	Evidence of undertaking at least 3 civil works of a cumulative value equivalent to Ksh 100,000,000.00 or above in the last 5 years. Provide relevant assignments preferably within the last 5 years **(2 marks per assignment)- (6 Marks)**			
	Specific experience (6 Marks)	**6**		
	Evidence of undertaking at least 3 similar assignments in Construction of Water Supply Pipelines of size 315mm diameter and above (ensure that at least 2 relevant assignments are within the last 5 years). **(2 marks per assignment) -(6 Marks)**			
2.2	**FINANCIAL CAPACITY**			
	Audited Accounts(6Marks)	**6**		
	A copy of signed and stamped Audited accounts for the years 2021/2022 to 2023/2024 with the Audit Firm/Auditor's ICPAK Number clearly indicated. **(2 marks for each year)- (6 Marks)**			
	Cash Flow(5Marks)	**5**		
	Ksh.70,000,000 and above –(5 marks)			
	Ksh.50,000,000-69,999,999- (3 marks)			
	Less than 50,000,000- (1 mark)			
2.3	**Proof of availability of equipment required (own or lease e.g copies of Log Books, Lease Agreement and any other relevant documents) –(38 Marks)**	**38**		
	Hydraulic Butt Fusion Machine Size 50mm – 315mm- (9 marks)			
	Concrete Mixer (capacity $0.3m^3$ to$1m^3$) –(6 marks)			
	Poker Vibrator (40mm – 60mm) –(6 marks)			
	1 No. Excavator (with provision for a rock breaker).-(6 marks)			
	7 / 10 / 15-ton Tipper Lorries-(6 marks)			
	Pick-Up – 1 Ton-(5 marks)			
2.4	**Experience of Key Personnel – (29 marks)** **NB: provide a summary/listing indicating the required key personnel as titled below.**	**29**		

	a) Project Manager – (7 marks) - Minimum Bsc. Civil Engineering (2 marks), Professional Engineer/ Registered with Engineers Board of Kenya (2 marks) (attach copies of qualification)- **(4 marks)** - Minimum 5 years relevant Experience (Attach copies/testimonials} (1.5 marks)- Certified CVs signed by both the employer and the employee (1.5 marks) –**(3 marks)**			
	b) Site Agent – (7 marks)			
	- Minimum Bsc. Civil Engineering (2 marks), Professional Engineer Registered with Engineers Board of Kenya (2 marks) (attach copies of qualification) – (4 Marks) - Minimum 7 years relevant Experience **(1.5 marks)** (Attach copies/testimonials}- Certified CVs signed by both the employer and the employee – (3 marks)			
	c) Engineering Surveyor – (5 marks) - Must have a minimum of Bsc. Surveying (3 marks) or Higher National Diploma (HND) in Surveying (2 marks) Diploma in Surveying (1 mark) (attach copies of qualification) – (3 marks) - 7 years and above relevant Experience (2 marks), below 7 years (1 mark) (Attach copies/testimonials}- Certified CVs signed by both the employer and the employee – (2 marks)			
	d) Foreman (Civil Works) – (5 marks) - Must have a minimum of Diploma in Civil Engineering/Building/ Construction or Equivalent (attach copies of qualification) – (3 marks) - 5 years and above relevant Experience, below 5 years (1 mark) (Attach copies/testimonials}- Certified CVs signed by both the employer and the employee – **(**2 marks)			

	e) Environmentalist – (5 marks) - Must have a minimum of Degree in Environmental Science and registered with NEMA as an associate expert– (3 marks) - 3 years relevant Experience (Attach copies/testimonials}- Certified CVs signed by both the employer and the employee - **(**2 marks)			
2.5	**PROPOSED METHODOLOGY / WORK PLAN (10 Marks) Attach a Gantt Chart or table clearly indicating the time frame and activities from Start to the - Completion of the Project**	**10**		
	Gantt Chart			
	Attached signed and stamped (5 marks)			
	Not attached (0 marks)			
	How adequate is the workplan			
	Adequate work plan indicating resource allocation (equipment, labour and finances)) (5 marks)			
	Inadequate (0 marks)			
	Total	**100**		

(iii) FINANCIAL EVALUATION

At this stage, bidders' financial quotations will be ranked from the lowest to the highest. The Lowest Evaluated Tender price shall be selected for award of contract.

2. Tender Evaluation (ITT 35)

Price evaluation: In addition to the criteria listed in ITT 35.2 (a) – (d) the following criteria shall apply:

i) **Alternative Completion Times,** if permitted under ITT 13.2, will be evaluated as follows: **N/A**

ii) **Alternative Technical Solutions** for specified parts of the Works, if permitted under ITT 13.4, will be evaluated as follows: ……**N/A**……

iii) **Other Criteria; i**f permitted under ITT 35.2(d) : ……**N/A**…….....

3. Multiple Contracts (N/A)

3.1 Multiple contracts will be permitted in accordance with ITT 35.4. Tenderers are evaluated on basis of Lots and the lowest evaluated tenderer identified for each Lot. The Procuring Entity will select one Option of the two Options listed below for award of Contracts.

OPTION 1

i) If a tenderer wins only one Lot, the tenderer will be awarded a contract for that Lot, provided the tenderer meets the Eligibility and Qualification Criteria for that Lot.

ii) If a tenderer wins more than one Lot, the tender will be awarded contracts for all won Lots, provided the tenderer meets the aggregate Eligibility and Qualification Criteria for all the Lots. The tenderer will be awarded the combination of Lots for which the tenderer qualifies and the others will be considered for award to second lowest the tenderers.

OPTION 2

The Procuring Entity will consider all possible combinations of won Lots [contract(s)] and determine the combination with the lowest evaluated price. Tenders will then be awarded to the Tenderer or Tenderers in the combinations provided the tenderer meets the aggregate Eligibility and Qualification Criteria for all the won Lots.

4. Alternative Tenders (ITT 13.1) (N/A)

An alternative if permitted under ITT 13.1, will be evaluated as follows:

The Procuring Entity shall consider Tenders offered for alternatives as specified in Part2-Works Requirements. Only the technical alternatives, if any, of the Tenderer with the Best Evaluated Tender conforming to the basic technical requirements shall be considered by the Procuring

5. MARGIN OF PREFERENCE (N/A)

5.1 If the TDS so specifies, the Procuring Entity will grant a margin of preference of fifteen percent (15%) to be loaded one valuated price of the foreign tenderers, where the percentage of shareholding of Kenyan citizens is less than fifty-one percent (51%).

5.2 Contractors applying for such preference shall be asked to provide, as part of the data for qualification, such information, including details of ownership, as shall be required to determine whether, according to the classification established by the Procuring Entity, a particular contract or group of contractors qualifies for a margin of preference.

5.3 After Tenders have been received and reviewed by the Procuring Entity, responsive Tenders shall be assessed to ascertain their percentage of shareholding of Kenyan citizens. Responsive tenders shall be classified into the following groups:

i) Group A: tenders offered by Kenyan Contractors and other Tenderers where Kenyan citizens hold shares of over fifty one percent (51%).

ii) Group B: tenders offered by foreign Contractors and other Tenderers where Kenyan citizens hold shares of less than fifty one percent (51%).

5.4 All evaluated tenders in each group shall, as a first evaluation step, be compared to determine the lowest tender, and the lowest evaluated tender in each group shall be further compared with each other. If, as a result of this comparison, a tender from Group A is the lowest, it shall be selected for the award. If a tender from Group B is the lowest, an amount equal to the percentage indicated in Item 3.1 of the respective tender price, including unconditional discounts and excluding provisional sums and the cost of day works, if any, shall be added to the evaluated price offered in each tender from Group B. All tenders shall then be compared using new prices with added prices to Group Band the lowest evaluated tender from Group A. If the tender from Group A is still the lowest tender, it shall be selected for award. If not, the lowest evaluated tender from Group B based on the first evaluation price shall be selected.

6. Post qualification and Contract award (ITT 39), more specifically,

a) In case the tender was subject to post-qualification, the contract shall be awarded to the lowest evaluated tenderer, subject to confirmation of pre-qualification data, if so required.

b) Incase the tender was not subject to post-qualification, the tender that has been determined to be the lowest evaluated tenderer shall be considered for contract award, subject to meeting each of the following conditions.

i) The Tenderer shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow of Kenya Shillings 5,000,000.

ii) Minimum average annual construction turnover of Kenya Shillings 10,000,000 equivalent calculated as total certified payments received for contracts in progress and/or completed within the last 5 No. years.

iii) At least **3 No.** of contract(s) of a similar nature executed within Kenya, or the East African Community or abroad, that have been satisfactorily and substantially completed as a prime contractor, or joint venture member or sub-contractor each of minimum value Kenya shillings 4,800,000 equivalent.

iv) Contractor's Representative and Key Personnel, which are specified as: Site Agent, EHS (Environmental Health and Safety Officer**,** Electrical/Mechanical Engineer *(As indicated in the qualification form below)*

v) Contractors key equipment listed on the table "Contractor's Equipment" below and more specifically listed as *[specify requirements for each lot as applicable]: Test Pumping Unit, Concrete Mixer, Poker Vibrator,*

Means of Transport for materials. (As indicated in the qualification form below)

vi) Other conditions depending on their seriousness.

a) **History of non-performing contracts**:
Tenderer and each member of JV incase the Tenderer is a JV, shall demonstrate that Non-performance of a contract did not occur because of the default of the Tenderer, or the member of a JV in the last **5 years.** The required information shall be furnished in the appropriate form.

b) Pending Litigation
Financial position and prospective long-term profitability of the Single Tenderer, and in the case the Tenderer is a JV, of each member of the JV, shall remain sound according to criteria established with respect to Financial Capability under Paragraph (i) above if all pending litigation will be resolved against the Tenderer. Tenderer shall provide information on pending litigations in the appropriate form.

c) Litigation History
There shall be no consistent history of court/arbitral award decisions against the Tenderer, in the last 5 years. All parties to the contract shall furnish the information in the appropriate form about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the years specified. A consistent history of awards against the Tenderer or any member of a JV may result in rejection of the tender.

7. QUALIFICATION FORM SUMMARY

1	**2**	**3**	***4***	***5***
Item No.	**Qualification Subject**	**Qualification Requirement**	***Document To be Completed by Tenderer***	***For Procuring Entity's Use (Qualification met or Not Met)***
1	Nationality	Nationality in accordance with ITT 3.6	Forms ELI – 1.1 and 1.2, with attachments	
2	Tax Obligations for Kenyan Tenderers	Has produced a current tax clearance certificate or tax exemption certificate issued by Kenya Revenue Authority in accordance with ITT 3.14.	Attachment	
3	Conflict of Interest	No conflicts of interest in accordance with ITT 3.3	Form of Tender	
4	PPRA Eligibility	Not having been declared ineligible by the PPRA as described in ITT 3.7	Form of Tender	
5	State- owned Enterprise	Meets conditions of ITT 3.8	Forms ELI – 1.1 and 1.2, with attachments	
6	Goods, equipment and services to be supplied under the contract	To have their origin in any country that is not determined ineligible under ITT 4.1	Forms ELI – 1.1 and 1.2, with attachments	
7	History of Non-Performing Contracts	Non-performance of a contract did not occur as a result of contractor default since 1st January, 2018.	Form CON-2	
8	Suspension Based on Execution of Tender/Proposal Securing Declaration by the Procuring Entity	Not under suspension based on-execution of a Tender/Proposal Securing Declaration pursuant to ITT 19.9	Form of Tender	
9	Pending Litigation	Tender's financial position and prospective long-term profitability still sound according to criteria established in 3.1 and assuming that all pending litigation will NOT	Form CON – 2	

1	2	3	*4*	*5*
Item No.	**Qualification Subject**	**Qualification Requirement**	***Document To be Completed by Tenderer***	***For Procuring Entity's Use (Qualification met or Not Met)***
		be resolved against the Tenderer.		
10	Litigation History	No consistent history of court/arbitral award decisions against the Tenderer since 1st January, 2018.	Form CON – 2	
11	Financial Capabilities	(i) The Tenderer shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements estimated as Kenya Shillings 6,000,000 equivalent for the subject contract(s) net of the Tenderer's other commitments. (ii) The Tenderers shall also demonstrate, to the satisfaction of the Procuring Entity, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments. (iii) The audited balance sheets or, if not required by the laws of the Tenderer's country, other financial statements acceptable to the Procuring Entity, for the last 3 years shall be submitted and must demonstrate the current soundness of the Tenderer's financial position and indicate its prospective long-term profitability.	Form FIN – 3.1, with attachments	
12	Average Annual Construction Turnover	Minimum average annual construction turnover of Kenya Shillings 15,000,000*, Equivalent* calculated as total certified payments received for contracts in progress and/or completed within the last 5 years, divided by 5 years	Form FIN – 3.2	
13	General Construction Experience	Experience under construction contracts in the role of prime contractor, JV member, sub-contractor, or management contractor for at least the last 5 years, starting 1st January, 2018.	Form EXP – 4.1 **Experience**	
14	Specific Construction & Contract Management	A minimum number of ***3No***. similar contracts specified below that have been satisfactorily and	Form EXP 4.2(a)	

1	2	3	*4*	*5*
Item No.	**Qualification Subject**	**Qualification Requirement**	***Document To be Completed by Tenderer***	***For Procuring Entity's Use (Qualification met or Not Met)***
	Experience	substantially completed as a prime contractor, joint venture member, management contractor or sub-contractor between 1st January, 2020 and tender submission deadline i.e. …. (Number) contracts, each of minimum value Kenya shillings 4,800,000 equivalent. The similarity of the contracts shall be based on the following: a) Supply and Installation of Solar Panels and associated cabling b) Supply of all materials and erection of solar panels mountain structure c) Supply and installation of 24m^3 galvanized pressed steel water tank d) Supply of all materials and erection of 12M high tank elevated steel structure e) Supply of all materials and construction of Pump control house and fencing works f) Installation of submersible pump at a depth of 200M		
15	Key Personell	**Project Manager –** Must have a minimum of Diploma in Water Engineering or equivalent. Minimum 5 years relevant Experience. **Driller -** Must be a holder of a certificate in drilling. Minimum 5 years relevant Experience. **Electrical/Mechanical Engineer -** Must have a minimum of Diploma in Electrical/Mechanical Engineering or equivalent. Minimum 5 years relevant Experience.	Forms PER 1 and PER 2	
16	Key Equipments	a) Test Pumping Unit b) Concrete Mixer c) Poker Vibrator d) Means of transport for Materials	Form EQU: Equipments	

SECTION IV - TENDERING FORMS

QUALIFICATION FORMS

1. FOREIGN TENDERERS 40% RULE.
2. TENDERER'S ELIGIBILITY- CONFIDENTIAL BUSINESS QUESTIONNAIRE
3. Form EQU: EQUIPMENT.
4. FORM PER -1.
5. FORM PER-2.
6. TENDERERS QUALIFICATION WITHOUT PRE-QUALIFICATION.
   - 6.1 FORM ELI-1.1.
   - 6.2 FORM ELI-1.2.
   - 6.3 FORM CON –2.
   - 6.4 FORM FIN –3.1.
   - 6.5 FORM FIN –3.2.
   - 6.6 FORM FIN –3.3.
   - 6.7 FORM FIN –3.4.
   - 6.8 FORM EXP -4.1.
   - 6.9 FORM EXP - 4.2(a).
   - 6.9 FORM EXP - 4.2 (a) (cont.).
   - 6.10 FORM EXP -4.2 (b).

OTHER FORMS

7. FORM OFTENDER.
8. FORM OF TENDER SECURITY - DEMAND BANKGUARANTEE.
9. FORM OF TENDER SECURITY (TENDERBOND).
10. FORM OF TENDER-SECURINGDECLARATION.
11. APPENDIX TO TENDER.

TECHNICAL PROPOSAL FORMS

Site Organization. Method
Statement. Mobilization
Schedule. Construction
Schedule.

QUALIFICATION FORMS

1. FOREIGN TENDERERS 40% RULE

Pursuant to ITT 3.9, a foreign tenderer must complete this form to demonstrate that the tender fulfils this condition.

ITEM	Description of Work Item	Describe location of Source	COST in K. shillings	Comments, if any
A	**Local Labor**			
1				
2				
3				
4				
5				
B	**Sub contracts from Local sources**			
1				
2				
3				
4				
5				
C	**Local materials**			
1				
2				
3				
4				
5				
D	**Use of Local Plant and Equipment**			
1				
2				
3				
4				
5				
E	Add any other items			
1				
2				
3				
4				
5				
6				
	TOTAL COST LOCAL CONTENT			
	PERCENTAGE OF CONTRACT PRICE			

3. FORM EQU: EQUIPMENT

The Tenderer shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III, Evaluation and Qualification Criteria. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Tenderer.

Item of equipment: _____		
Equipment information	Name of manufacturer: _____	Model and power rating: _____
	Capacity: _____	Year of manufacture: _____
Current status	Current location: _____	
	Details of current commitments: _____	

Source	Indicate source of the equipment ☐ Owned ☐ Rented ☐ Leased ☐ Specially manufactured

Omit the following information for equipment owned by the Tenderer.

Owner	Name of owner:	
	Address of owner:	
	Telephone:	Contact name and title:
	Fax:	Telex:
Agreements	Details of rental / lease / manufacture agreements specific to the project	

4. FORM PER-1

Contractor's Representative and Key Personnel Schedule

Tenderers should provide the names and details of the suitably qualified Contractor's Representative and Key Personnel to perform the Contract. The data on their experience should be supplied using the Form PER-2 below for each candidate.

Contractor' Representative and Key Personnel.

1.	**Title of position:** Contractor's Representative	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
2.	**Title of position:** *[_____]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
3.	**Title of position:** *[_____]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]

	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
4.	**Title of position:** *[_____]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
5.	**Title of position:** *[insert title]*	
	Name of candidate	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]

5. FORM PER-2:

Resume and Declaration - Contractor's Representative and Key Personnel

Name of Tenderer

Position: [*title of position from Form PER-1*]		
Personnel information	Name:	Date of birth:
	Address:	E-mail:
	Professional qualifications:	
	Academic qualifications:	
	Language proficiency: *[language and levels of speaking, reading and writing skills]*	
Details		
	Address of Procuring Entity:	
	Telephone:	Contact (manager / personnel officer):
	Fax:	
	Job title:	Years with present Procuring Entity:

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

Project	**Role**	**Duration of involvement**	**Relevant experience**
[main project details]	***[role and responsibilities on the project]***	***[time in role]***	***[describe the experience relevant to this position]***

DECLARATION

I, the under signed *[insert either "Contractor's Representative" or "Key Personnel" as applicable]*, certify that to the Lowest of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Tender:

Commitment	**Details**
Commitment to duration of contract:	*[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]*
Time commitment:	*[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]*

I understand that any misrepresentation or omission in this Form may:

a) be taken into consideration during Tenderevaluation;
b) result in my disqualification from participating in theTender;
c) result in my dismissal from the contract.

Name of Contractor's Representative or Key Personnel: [*insert name*]

Signature:_____ Date:

(day month year): _____

Countersignature of authorized representative of theTenderer:

Signature:_____ Date:

(day month year): _____

TENDERERS QUALIFICATION WITHOUT PRE-QUALIFICATION

To establish its qualifications to perform the contract in accordance with Section III, Evaluation and Qualification Criteria the Tenderer shall provide the information requested in the corresponding Information Sheets included hereunder.

4.1 FORM ELI-1.1Tenderer

Information Form

Date:_____ ITT

No. and title:_____

Tenderer's name
In case of Joint Venture (JV), name of each member:
Tenderer's actual or intended country of registration: *[icate country of Constitution]*
Tenderer's actual or intended year of incorporation:
Tenderer's legal address [in country of registration]:
Tenderer's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITT 3.6 ☐ In case of JV, letter of intent to form JV or JV agreement, in accordance with ITT 3.5 ☐ In case of state-owned enterprise or institution, in accordance with ITT 3.8, documents establishing: • Legal and financial autonomy • Operation under commercial law • Establishing that the Tenderer is not under the supervision of the Procuring Entity 2. Included are the organizational chart and a list of Board of Directors

4.2 FORM ELI-1.2

Tenderer's JV Information Form
(To be completed for each member of Tenderer's JV)

Date:_____ ITT

No. andtitle:_____

Tenderer's JV name:
JV member's name:
JV member's country of registration:
JV member's year of constitution:
JV member's legal address in country of constitution:
JV member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of

☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITT 43.6. ☐ In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and that they are not under the supervision of the Procuring Entity, in accordance with ITT 3.8. 2. Included are the organizational chart and a list of Board of Directors

43 FORM CON – 2

Historical Contract Non-Performance, Pending Litigation and Litigation History

Tenderer's Name:_____ Date:
_____ JV
Member's Name_____ ITT
No. and title:_____

Non-Performed Contracts in accordance with Section III, Evaluation and Qualification Criteria			
☐ Contract non-performance did not occur since 1st January *[insert year]* specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1. ☐ Contract(s) not performed since 1st January *[insert year]* specified in Section III, Evaluation and Qualification Criteria, requirement 2.1			
Year	**Non- performed portion of contract**	**Contract Identification**	**Total Contract Amount (current value, currency, exchange rate and Kenya Shilling equivalent)**
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Procuring Entity: *[insert full name]* Address of Procuring Entity: *[insert street/city/country]* Reason(s) for nonperformance: *[indicate main reason(s)]*	*[insert amount]*
Pending Litigation, in accordance with Section III, Evaluation and Qualification Criteria			
☐ No pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3. ☐ Pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3 as indicated below.			

Year of dispute	**Amount in dispute (currency)**	**Contract Identification**	**Total Contract Amount (currency), Kenya Shilling Equivalent (exchange rate)**
		Contract Identification: _____ Name of Procuring Entity: _____ Address of Procuring Entity: _____ Matter in dispute: _____ Party who initiated the dispute: ____ Status of dispute: _____	
		Contract Identification: Name of Procuring Entity: Address of Procuring Entity: Matter in dispute: Party who initiated the dispute: Status of dispute:	
Litigation History in accordance with Section III, Evaluation and Qualification Criteria			
☐ No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-			

Factor 2.4. ☐ Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4 as indicated below.			
Year of award	**Outcome as percentage of Net Worth**	**Contract Identification**	**Total Contract Amount (currency), Kenya Shilling Equivalent (exchange rate)**
[insert year]	*[insert percentage]*	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Procuring Entity: *[insert full name]* Address of Procuring Entity: *[insert street/city/country]* Matter in dispute: *[indicate main issues in dispute]* Party who initiated the dispute: *[indicate "Procuring Entity" or "Contractor"]* Reason(s) for Litigation and award decision *[indicate main reason(s)]*	*[insert amount]*

4.4 FORM FIN –3.1:

Financial Situation and Performance

Tenderer's Name:_____ Date: _____ JV
Member's Name_____ ITT
No. and title:_____

4.4.1. Financial Data

Type of Financial information in_____ (currency)	**Historic information for previous _____ *years,* _____ (amount in currency, currency, exchange rate*, USD equivalent)**				
	Year 1	Year 2	Year 3	Year 4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					

Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

**Refer to ITT 15 for the exchange rate*

6.4.2 Sources of Finance

Specify sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.

No.	Source of finance	Amount (Kenya Shilling equivalent)
1		
2		
3		

6.4.3 Financial documents

The Tenderer and its parties shall provide copies of financial statements for_____years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.1. The financial statements shall:

a) reflect the financial situation of the Tenderer or incase of JV member, and not an affiliated entity (such as parent company or group member).
b) be independently audited or certified in accordance with local legislation.
c) be complete, including all notes to the financial statements.
d) correspond to accounting periods already completed and audited.

Attached are copies of financial statements [1] for the_____years required above; and complying with the requirements

6.5 FORM FIN – 3.2:

Average Annual Construction Turnover

Tenderer's Name:_____ Date:
_____ JV
Member's Name_____ ITT

No. and title:_____

	Annual turnover data (construction only)		
Year	**Amount Currency**	**Exchange rate**	**Kenya Shilling equivalent**
[indicate year]	*[insert amount and indicate currency]*		
Average Annual Construction Turnover *			

* See Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.

6.6 FORM FIN –3.3:

Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cashflow demands of the subject contractor contracts as specified in Section III, Evaluation and Qualification Criteria.

6.7 FORM FIN–3.4:

Current Contract Commitments / Works in Progress

Tenderers and each member to a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Starting Year	Ending Year	Contract Identification	Role of Tenderer
		Contract name: _____ Brief Description of the Works performed by the Tenderer: _____ Amount of contract: _____ Name of Procuring Entity: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Tenderer: _____ Amount of contract: _____ Name of Procuring Entity: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Tenderer: _____ Amount of contract: _____ Name of Procuring Entity: _____	

		Address: _____	

6.8 FORM EXP -4.1

General Construction Experience

Tenderer's Name:_____ Date: _____ JV
Member's Name:_____ ITT
No. and title:_____

Similar Contract No.	**Information**			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor ☐	Member in JV ☐	Management Contractor ☐	Sub-contractor ☐
Total Contract Amount			**Kenya Shilling**	
If member in a JV or sub-contractor, specify participation in total Contract amount				
Procuring Entity's Name:				
Address: Telephone/fax number E-mail:				

6.9 FORM EXP -4.2(a)

Specific Construction and Contract Management Experience

Tenderer's Name:_____ Date: _____ JV
Member's Name_____ ITT
No. and title:_____

Similar Contract No.	**Information**
Description of the similarity in accordance with Sub-Factor 4.2(a) of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

6.10 FORM EXP -4.2(b)

Construction Experience in Key Activities

Tenderer's Name:_____ Date: _____

Tenderer's JV Member Name:_____ Sub-contractor's Name[2] (as perITT34):_____ ITT No. and title:_____

All Sub-contractors for key activities must complete the information in this form as per ITT 34 and Section III, Evaluation and Qualification Criteria, Sub-Factor 4.2.

l. Key Activity No One: _

	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor ☐	Member in JV ☐	Management Contractor ☐	Sub-contractor ☐
Total Contract Amount			**Kenya Shilling**	
Quantity (Volume, number or rate of production, as applicable) performed under the contract per year or part of the year	Total quantity in the contract (i)	Percentage participation (ii)		Actual Quantity Performed (i) x (ii)
Year 1				
Year 2				
Year 3				
Year 4				
Procuring Entity's Name:				
Address: Telephone/fax number E-mail:				

	Information
Description of the key activities in accordance with Sub-Factor 4.2(b) of Section III:	

2. Activity No. Two

3. . ……

OTHER FORMS

7. FORM OF TENDER

(Amended and issued pursuant to PPRA CIRCULAR No. 02/2022)

INSTRUCTIONS TO TENDERERS

i) *All italicized text is to help the Tenderer in preparing this form.*

ii) *The Tenderer must prepare this Form of Tender on stationery with its letterhead clearly showing the Tenderer's complete name and business address. Tenderers are reminded that this is a mandatory requirement.*

ii) *Tenderer must complete and sign CERTIFICATE OF INDEPENDENT TENDER DETERMINATION and the SELF DECLARATION FORMS OF THE TENDERER as listed under (xxii) below.*

Date of this Tender submission:.....*[insert date (as day, month and year) of Tender submission]* **Tender Name and Identification**:.....*[insert identification]* **Alternative No.**:.....*[insert identification No if this is a Tender for an alternative]*

To: ..... *[Insert complete name of Procuring Entity]*

Dear Sirs,

1. In accordance with the Conditions of Contract, Specifications, Drawings and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct and complete the Works and remedy any defects therein for the sum of Kenya Shillings [*[Amount in figures]* _____Kenya Shillings *[amount in words]*_____ _____

   The above amount includes foreign currency amount (s) of [*state figure or a percentage and currency*] [figures] _____[words]_____ _____

   The percentage or amount quoted above does not include provisional sums, and only allows not more than two foreign currencies.

2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Engineer's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Particular Conditions of Contract.

3. We agree to adhere by this tender until_____*[Insert date],* and it shall remain binding upon us and may be accepted at any time before that date.

4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute abinding Contract between us. We further understand that you are not bound to accept the lowest or any tender you may receive.

5. We, the undersigned, further declare that:

   i) *No reservations:* We have examined and have no reservations to the tender document, including Addenda issued in accordance with ITT 8;

   ii) *Eligibility:* We meet the eligibility requirements and have no conflict of interest in accordance with ITT 3 and 4;

   iii) *Tender-Securing Declaration:* We have not been suspended nor declared ineligible by the Procuring Entity based on execution of a Tender-Securing or Proposal-Securing Declaration in the Procuring Entity's Country in

accordance with ITT 19.8;

(iv) Conformity: We offer to execute in conformity with the tendering documents and in accordance with the implementation and completion specified in the construction schedule, the following Works: *[insert a brief description of the Works];*

(v) Tender Price: The total price of our Tender, excluding any discounts offered in item 1 above is: *[Insert one of the options below as appropriate]*

(vi) **Option1,** incase of one lot: Total price is: [*insert the total price of the Tender in words and figures, indicating the various amounts and the respective currencies*]; Or

Option2, in case of multiple lots:

a) *Total price of each lot* [*insert the total price of each lot in words and figures, indicating the various amounts and the respective currencies*]; and

b) *Total price of all lots* (sum of all lots) [*insert the total price of all lots in words and figures, indicating the various amounts and the respective currencies*];

vii) Discounts: The discounts offered and the methodology for their application are:

viii) The discounts offered are: [*Specify in detail each discount offered.*]

ix) The exact method of calculations to determine the net price after application of discounts is shown below: [*Specify in detail the method that shall be used to apply the discounts*];

x) *Tender Validity Period:* Our Tender shall be valid for the period specified in TDS 18.1 (as amended, if applicable) from the date fixed for the Tender submission deadline specified in TDS 22.1(as amended, if applicable), and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

xi) *Performance Security:* If our Tender is accepted, we commit to obtain a Performance Security in accordance with the Tendering document;

xii) *One Tender Per Tender:* We are not submitting any other Tender(s) as an individual Tender, and we are not participating in any other Tender(s) as a Joint Venture member or as a subcontractor, and meet the requirements of ITT3.4, other than alternative Tenders submitted in accordance with ITT 13.3;

xiii) *Suspension and Debarment:* We, along with any of our subcontractors, suppliers, Engineer, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Public Procurement Regulatory Authority or any other entity of the Government of Kenya, or any international organization.

xiv) *State-owned enterprise or institution:* [*select the appropriate option and delete the other*] [*We are not a state- owned enterprise or institution*]/[*We are a state-owned enterprise or institution but meet the requirements of ITT 3.7*];

xv) *Commissions, gratuities, fees:* We have paid, or will pay the following commissions, gratuities, or fees with respect to the tender process or execution of the Contract: *[insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]*

Name of Recipient	**Address**	**Reason**	**Amount**

(If none has been paid or is to be paid, indicate "none.")

xvi) *Binding Contract:* We understand that this Tender, together with your written acceptance thereof included in your

Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;

xvii) *Not Bound to Accept:* We understand that you are not bound to accept the lowest evaluated cost Tender, the Most Advantageous Tender or any other. Tender that you may receive;

xviii) *Fraud and Corruption:* We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Fraud and Corruption;

xix) *Collusive practices:* We hereby certify and confirm that the tender is genuine, non-collusive and made with the intention of accepting the contract if awarded. To this effect we have signed the "Certificate of Independent Tender Determination" attached below.

xx) We undertake to adhere by the Code of Ethics for Persons Participating in Public Procurement and Asset Disposal, copy available from_____(*specify website*) during the procurement process and the execution of any resulting contract.

xxi) **Beneficial Ownership Information:** We commit to provide to the procuring entity the Beneficial Ownership Information in conformity with the Beneficial Ownership Disclosure Form upon receipt of notification of intention to enter into a contract in the event we are the successful tenderer in this subject procurement proceeding.

xxii) We, the Tenderer, have duly completed, signed and stamped the following Forms as part of our Tender:

a) Tenderer's Eligibility; Confidential Business Questionnaire – to establish we are not in any conflict to interest.
b) Certificate of Independent Tender Determination – to declare that we completed the tender without colluding with other tenderers.
c) Self-Declaration of the Tenderer– to declare that we will, if awarded a contract, not engage in any form of fraud and corruption.
d) Declaration and commitment to the Code of Ethics for Persons Participating in Public Procurement and Asset Disposal.

Further, we confirm that we have read and understood the full content and scope of fraud and corruption as informed in **"Appendix 1- Fraud and Corruption**" attached to the Form of Tender. **Name of**

the Tenderer: *[*insert complete name of person signing the Tender*]

Name of the person duly authorized to sign the Tender on behalf of the Tenderer: **[*insert complete name of person duly authorized to sign the Tender*]

Title of the person signing the Tender: [*insert complete title of the person signing the Tender*] **Signatureof the**

person named above: [*insert signature of person whose name and capacity are shown above*] **Date signed** [*insert*

date of signing] day of [*insert month*], [*insert year*]

Date signed_____day of_____,_____

Notes
** In the case of the Tender submitted by joint venture specify the name of the Joint Venture as Tenderer*
*** Person signing the Tender shall have the power of attorney given by the Tenderer to be attached with the Tender,*

A. TENDERER'S ELIGIBILITY-CONFIDENTIAL BUSINESS QUESTIONNAIRE

Instructions to Tenderer

Tender is instructed to complete the particulars required in this Form, *one form for each entity if Tender is a JV*. Tenderer is further reminded that it is an offence to give false information on this Form.

i) Tenderer's details

	ITEM	DESCRIPTION
1	Name of the Procuring Entity	
2	Reference Number of the Tender	
3	Date and Time of Tender Opening	
4	Name of the Tenderer	
5	Full Address and Contact Details of the Tenderer.	1. Country 2. City 3. Location 4. Building 5. Floor 6. Postal Address 7. Name and email of contact person.
6	Current Trade License Registration Number and Expiring date	
7	Name, country and full address (*postal and physical addresses, email, and telephone number*) of Registering Body/Agency	
8	Description of Nature of Business	
9	Maximum value of business which the Tenderer handles.	
10	State if Tenders Company is listed in stock exchange, give name and full address (*postal and physical addresses, email, and telephone number*) of state which stock exchange	

General and Specific Details

ii) Sole Proprietor, provide the following details.

Name in full_____Age_____
Nationality_____Country of Origin_____
Citizenship _____

iii) Partnership, provide the following details.

	Names of Partners	Nationality	Citizenship	% Shares owned
1				
2				
3				

(iv) Registered Company, provide the following details.

i) Private or public Company _____

ii) State the nominal and issued capital of the Company

Nominal Kenya Shillings (Equivalent).....

Issued Kenya Shillings (Equivalent).....

iii) Give details of Directors as follows.

	Names of Director	Nationality	Citizenship	% Shares owned
1				
2				
3				

(v) DISCLOSURE OF INTEREST- Interest of the Firm in the Procuring Entity.

i) Are there any person/persons in…… (*Name of Procuring Entity)* who has/have an interest or relationship in this firm? Yes/No……

If yes, provide details as follows.

	Names of Person	Designation in the Procuring Entity	Interest or Relationship with Tenderer
1			
2			
3			

ii) Conflict of interestdisclosure

	Type of Conflict	Disclosure YES OR NO	If YES provide details of the relationship with Tenderer
1	Tenderer is directly or indirectly controls, is controlled by or is under common control with another tenderer.		
2	Tenderer receives or has received any direct or indirect subsidy from another tenderer.		
3	Tenderer has the same legal representative as another tenderer		
4	Tender has a relationship with another tenderer, directly or through common third parties that puts it in a position to influence the tender of another tenderer, or influence the decisions of the Procuring Entity regarding this tendering process.		
5	Any of the Tenderer's affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the tender.		
6	Tenderer would be providing goods, works, non-consulting services or consulting services during implementation of the contract specified in this Tender Document.		
7	Tenderer has a close business or family relationship with a professional staff of the Procuring Entity who are directly or indirectly involved in the preparation of the Tender document or specifications of the Contract, and/or the Tender evaluation process of such contract.		
8	Tenderer has a close business or family relationship with a professional staff of the Procuring Entity who would be involved in the implementation or supervision of such Contract.		
9	Has the conflict stemming from such relationship stated in item 7 and 8 above been resolved in a manner acceptable to the Procuring Entity throughout the tendering process and execution of the Contract?		

Certification

On behalf of the Tenderer, I certify that the information given above is complete, current and accurate as at the date of submission.

Full Name_____ Title or Designation_____

_____ _____
(Signature) *(Date)*

B. CERTIFICATE OF INDEPENDENT TENDER DETERMINATION

I, the undersigned, in submitting the accompanying Letter of Tender to the_____[Name of Procuring Entity] for:_____[Name and number of tender] in response to the request for tenders made by:_____[Name of Tenderer] do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of_____[Name of Tenderer] that:

1. I have read and I understand the contents of this Certificate;

2. I understand that the Tender will be disqualified if this Certificate is found not to be true and complete in every respect;

3. I am the authorized representative of the Tenderer with authority to sign this Certificate, and to submit theTender on behalf of the Tenderer;

4. For the purposes of this Certificate and the Tender, I understand that the word "competitor" shall include any individual or organization, other than the Tenderer, whether or not affiliated with the Tenderer, who:
   a) has been requested to submit a Tender in response to this request for tenders;
   b) could potentially submit a tender in response to this request for tenders, based on their qualifications, abilities or experience;

5. The Tenderer discloses that [check one of the following, as applicable]:
   a) The Tenderer has arrived at the Tender independently from, and without consultation, communication, agreement or arrangement with, any competitor;
   b) theTenderer has entered into consultations, communications, agreements or arrangements with one or more competitors regarding this request for tenders, and the Tenderer discloses, in the attached document(s), complete details thereof, including the names of the competitors and the nature of, and reasons for, such consultations, communications, agreements or arrangements;

6. In particular, without limiting the generality of paragraphs (5) (a) or (5) (b) above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
   a) prices;
   b) methods, factors or formulas used to calculate prices;
   c) the intention or decision to submit, or not to submit, a tender; or
   d) the submission of a tender which does not meet the specifications of the request for Tenders; except as specifically disclosed pursuant to paragraph (5) (b) above;

7. In addition, there has been no consultation, communication, agreement or arrangement with any competitor regarding the quality, quantity, specifications or delivery particulars of the works or services to which this request for tenders relates, except as specifically authorized by the procuring authority or as specifically disclosed pursuant to paragraph (5) (b) above;

8. The terms of the Tender have not been, and will not be, knowingly disclosed by the Tenderer, directly or indirectly, to any competitor, prior to the date and time of the official tender opening, or of the awarding of the Contract, whichever comes first, unless otherwise required by law or as specifically disclosed pursuant to paragraph (5) (b) above.

Name_____ Title

_____ Date

_____

[Name, title and signature of authorized agent of Tenderer and Date]

SELF-DECLARATION FORMS

FORM SD1

SELF DECLARATION THAT THE PERSON/TENDERER IS NOT DEBARRED IN THE MATTER OF THE PUBLIC PROCUREMENT AND ASSET DISPOSAL ACT 2015.

I, ……., of Post Office Box …….……. being a resident of …….. in the Republic of ……. do hereby make a statement as follows: -

1. THAT I am the Company Secretary/Chief Executive/Managing Director/Principal Officer/Director of ……...…….. *(insert name of the Company)* who is a Bidder in respect of Tender No. …….. for ……. *(insert tender title/description)* for ……. *(insert name of the Procuring entity)* and duly authorized and competent to make this statement.

2. THAT the aforesaid Bidder, its Directors and subcontractors have not been debarred from participating in procurement proceeding under Part IV of the Act.

3. THAT what is deponed to herein above is true to the best of my knowledge, information and belief.

……. ……. ……
(Title) (Signature) (Date)

Bidder Official Stamp

FORM SD2
SELF DECLARATION THAT THE TENDERER WILL NOT ENGAGE IN ANY CORRUPT OR FRAUDULENT PRACTICE

I, ……. of P. O. Box ……. being a resident of……. in the Republic of…_____…… .do hereby make a statement as follows: -

1. THAT I am the Chief Executive/Managing Director/PrincipalOfficer/Director of ……...…… *(insert name of the Company)* who is a Bidder in respect of Tender No. …….. for ……... *(insert tender title/description)* for …… *(insert name of the Procuring entity)* and duly authorized and competent to make this statement.

2. THAT the aforesaid Bidder, its servants and/or agents /subcontractors will not engage in any corrupt or fraudulent practice and has not been requested to pay any inducement to any member of the Board, Management, Staff and/or employees and/or agents of……. *(insert name of the Procuring entity)* which is the procuring entity.

3. THAT the aforesaid Bidder, its servants and/or agents /subcontractors have not offered any inducement toany member of the Board, Management, Staff and/or employees and/or agents of……... *(name of the procuring entity)*

4. THAT the aforesaid Bidder will not engage/has not engaged in any corrosive practice with other bidders participating in the subject tender

5. THAT what is deponed to herein above is true to the best of my knowledge, information and belief.

…… …… ……
(Title) (Signature) (Date)

Bidder's Official Stamp

DECLARATION AND COMMITMENT TO THE CODE OF ETHICS

I …….....……. (person) on behalf of *(Name of the Business/Company/Firm*) …….....declare that I have read and fully understood the contents of the Public Procurement & Asset Disposal Act, 2015, Regulations and the Code of Ethics for persons participating in Public Procurement and Asset Disposal and my responsibilities under the Code.

I do hereby commit to abide by the provisions of the Code of Ethics for persons participating in Public Procurement and Asset Disposal.

Name of Authorized signatory.....

Sign.....

Position.....

Office address..... Telephone.....
E-mail.....
Name of the Firm/Company.....
Date.....

(Company Seal/Rubber Stamp where applicable)
Witness

Name.....

Sign.....

Date.....

D. APPENDIX 1-FRAUD AND CORRUPTION

(Appendix 1 shall not be modified)

1. Purpose

1.1 The Government of Kenya's Anti-Corruption and Economic Crime laws and their sanction's policies and procedures, Public Procurement and Asset Disposal Act *(no. 33 of 2015)* and its Regulation, and any other Kenya's Acts or Regulations related to Fraud and Corruption, and similar offences, shall apply with respect to Public Procurement Processes and Contracts that are governed by the laws of Kenya.

2. Requirements

2.1 The Government of Kenya requires that all parties including Procuring Entities, Tenderers, (applicants/proposers), Consultants, Contractors and Suppliers; any Sub-contractors, Sub-consultants, Service providers or Suppliers; any Agents (whether declared or not); and any of their Personnel, involved and engaged in procurement under Kenya's Laws and Regulation, observe the highest standard of ethics during the procurement process, selection and contract execution of all contracts, and refrain from Fraud and Corruption and fully comply with Kenya's laws and Regulations as per paragraphs 1.1 above.

2.2 Kenya's public procurement and asset disposal act *(no. 33 of 2015)* under Section 66 describes rules to be followed and actions to be taken in dealing with Corrupt, Coercive, Obstructive, Collusive or Fraudulent practices, and Conflicts of Interest in procurement including consequences for offences committed. A few of the provisions noted below highlight Kenya's policy of no tolerance for such practices and behavior:

1) a person to whom this Act applies shall not be involved in any corrupt, coercive, obstructive, collusive or fraudulent practice; or conflicts of interest in any procurement or asset disposal proceeding;

2) A person referred to under subsection (1) who contravenes the provisions of that sub-section commits an offence;

3) Without limiting the generality of the subsection (1) and (2), the person shall be—
   a) disqualified from entering into a contract for a procurement or asset disposal proceeding; or
   b) if a contract has already been entered into with the person, the contract shall be voidable;

4) The voiding of a contract by the procuring entity under subsection (7) does not limit any legal remedy the procuring entity may have;

5) An employee or agent of the procuring entity or a member of the Board or committee of the procuring entity who has a conflict of interest with respect to a procurement—
   a) shall not take part in the procurement proceedings;
   b) shall not, after a procurement contract has been entered into, take part in any decision relating to the procurement or contract; and
   c) shall not be a subcontractor for the bidder to whom was awarded contract, or a member of the group of bidders to whom the contract was awarded, but the subcontractor appointed shall meet all the requirements of this Act.

6) An employee, agent or member described in subsection (1) who refrains from doing anything prohibited under that subsection, but for that subsection, would have been within his or her duties shall disclose the conflict of interest to the procuring entity;

7) If a person contravenes subsection (1) with respect to a conflict of interest described in subsection (5) (a) and the contract is awarded to the person or his relative or to another person in whom one of them had a director indirect pecuniary interest, the contract shall be terminated and all costs incurred by the public entity shall be made good by the awarding officer. Etc.

2.3 In compliance with Kenya's laws, regulations and policies mentioned above, the Procuring Entity:

a) Defines broadly, for the purposes of the above provisions, the terms set forth below as follows:

i) "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

ii) "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;

iii) "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

v) "obstructive practice" is:

- deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede investigation by Public Procurement Regulatory Authority (PPRA) or any other appropriate authority appointed by Government of Kenya 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; or

- acts intended to materially impede the exercise of the PPRA's or the appointed authority's inspection and audit rights provided for under paragraph 2.3 e. below.

b) Defines more specifically, in accordance with the above procurement Act provisions set forth for fraudulent and collusive practices as follows:

"fraudulent practice" includes a misrepresentation of fact in order to influence a procurement or disposal process or the exercise of a contract to the detriment of the procuring entity or the tenderer or the contractor, and includes collusive practices amongst 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.

c) Rejects a proposal for award[1] of a contract if PPRA determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;

d) Pursuant to the Kenya's above stated Acts and Regulations, may sanction or recommend to appropriate authority(ies) for sanctioning and debarment of a firm or individual, as applicable under the Acts and Regulations;

e) Requires that a clause be included in Tender documents and Request for Proposal documents requiring (i) Tenderers (applicants/proposers), Consultants, Contractors, and Suppliers, and their Sub-contractors, Sub-consultants, Service providers, Suppliers, Agents personnel, permit the PPRA or any other appropriate authority appointed by Government of Kenya to inspect[2] all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the PPRA or any other appropriate authority appointed by Government of Kenya; and

f) Pursuant to Section 62 of the above Act, requires Applicants/Tenderers to submit along with their Applications/Tenders/Proposals a "Self-Declaration Form" as included in the procurement document declaring that they and all parties involved in the procurement process and contract execution have not engaged/will not engage in any corrupt or fraudulent practices.

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[1] *For the avoidance of doubt, a party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and tendering, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.*

[2] *Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Investigating Authority or persons appointed by the Procuring Entity to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraudand Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of*

information.

FORM OF TENDER SECURITY-[Option 1–Demand Bank Guarantee]

Beneficiary:_____

Request for Tenders No:_____**Date:**

_____

TENDER GUARANTEE No.:_____

Guarantor: _____

1. We have been informed that_____(here-in-after called "the Applicant") has submitted or will submit to the Beneficiary its Tender (here in after called" the Tender") for the execution of_____ under Request for Tenders No._____("the ITT").

2. Furthermore, we understand that, according to the Beneficiary's conditions, Tenders must be supported by a Tender guarantee.

3. At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of_____(_____) upon receipt by us of the Beneficiary's complying demand, supported by the Beneficiary's statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating that either the Applicant:

(a) has withdrawn its Tender during the period of Tender validity set forth in the Applicant's Letter of Tender ("the Tender Validity Period"), or any extension thereto provided by the Applicant; or

b) having been notified of the acceptance of its Tender by the Beneficiary during the Tender Validity Period or any extension there to provided by the Applicant, (i) has failed to execute the contract agreement, or (ii) has failed to furnish the Performance.

4. This guarantee will expire: (a) if the Applicant is the successful Tenderer, upon our receipt of copies of the contract agreement signed by the Applicant and the Performance Security and, or (b) if the Applicant is not the successful Tenderer, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Applicant of the results of the Tendering process; or (ii) thirty days after the end of the Tender Validity Period.

5. Consequently, any demand for payment under this guarantee must be received by us at the office indicated above onor before that date.

_____

[signature(s)]

Note: All italicized text is for use in preparing this form and shall be deleted from the final product.

FORMAT OF TENDER SECURITY [Option 2–Insurance Guarantee]

TENDER GUARANTEE No.: _____

1. Whereas …… [*Name of the tenderer]* (hereinafter called "the tenderer") has submitted its tender dated …… [*Date of submission of tender]* for the …… *[Name and/or description of the tender]* (hereinafter called "the Tender") for the execution of_under Request for Tenders No._____("the ITT").

2. KNOW ALL PEOPLE by these presents that WE …… of …… [**Name of Insurance Company**] having our registered office at …… (hereinafter called "the Guarantor"), are bound unto …….. [*Name of Procuring Entity*] (hereinafter called "the Procuring Entity") in the sum of …… (Currency and guarantee amount) for which payment well and truly to be made to the said Procuring Entity, the Guarantor binds itself, its successors and assigns, jointly and severally, firmly by these presents.

   Sealed with the Common Seal of the said Guarantor this ___day of _____ 20 __.

3. NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Applicant:

   a) has withdrawn its Tender during the period of Tender validity set forth in the Principal's Letter of Tender ("the Tender Validity Period"), or any extension thereto provided by the Principal; or

   b) having been notified of the acceptance of its Tender by the Procuring Entity during the Tender Validity Period or any extension thereto provided by the Principal; (i) failed to execute the Contract agreement; or (ii) has failed to furnish the Performance Security, in accordance with the Instructions to tenderers ("ITT") of the Procuring Entity's Tendering document.

   then the guarantee undertakes to immediately pay to the Procuring Entity up to the above amount upon receipt of the Procuring Entity's first written demand, without the Procuring Entity having to substantiate its demand, provided that in its demand the Procuring Entity shall state that the demand arises from the occurrence of any of the above events, specifying which event(s) has occurred.

4. This guarantee will expire: (a) if the Applicant is the successful Tenderer, upon our receipt of copies of the contract agreement signed by the Applicant and the Performance Security and, or (b) if the Applicant is not the successful Tenderer, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Applicant of the results of the Tendering process; or (ii)twenty-eight days after the end of the Tender Validity Period.

5. Consequently, any demand for payment under this guarantee must be received by us at the office indicated above on or before that date.

_____	_____
[Date]	*[Signature of the Guarantor]*
_____	_____
[Witness]	*[Seal]*

Note: All italicized text is for use in preparing this form and shall be deleted from the final product.

FORM OF TENDER-SECURING DECLARATION

[The Bidder shall complete this Form in accordance with the instructions indicated] Date:.....

[Insert date (as day, month and year) of Tender Submission]

Tender No.:..... . *[Insert number of tendering process]*

To:..... *[Insert complete name of Purchaser]*

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, bids must be supported by a Tender-Securing Declaration.

2. I/We accept that I/we will automatically be suspended from being eligible for tendering in any contract with the Purchaser 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 bid conditions, because we–(a) have withdrawn our tender during the period of tender validity specified by us in the Tendering Data Sheet; or (b) having been notified of the acceptance of our Bid by the Purchaser during the period of bid 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 instructions to tenders.

3. I/We understand that this Tender Securing Declaration shall expire if we are not the successful Tenderer(s), upon the earlier of:
   a) our receipt of a copy of your notification of the name of the successful Tenderer; or
   b) thirty days after the expiration of our Tender.

4. I/We understand that if I am/we are/in a Joint Venture, the Tender Securing Declaration must be in the name of the Joint Venture that submits the bid, and the Joint Venture has not been legally constituted at the time of bidding, the Tender Securing Declaration shall be in the names of all future partners as named in the letter of intent.

Signed:……..……..

Capacity / title (director or partner or sole proprietor, etc.) …….…….

Name:…….. Duly

authorized to sign the bid for and on behalf of: *[insert complete name of Tenderer]* Dated

on……. day of…….……. *[Insert date of signing]*

Seal or stamp

Appendix to Tender

Schedule of Currency requirements

Summary of currencies of the Tender for_____*[insert name of Section of the Works]*

Name of currency	***Amounts payable***
Local currency: _____	
Foreign currency #1: _____	
Foreign currency #2: _____	
Foreign currency #3: _____	

Provisional sums expressed in local currency	[To be entered by the Procuring Entity]

5. TECHNICAL PROPOSAL

The tender shall complete these sections as a Technical proposal to indicate how he/she intends to proceed with the works. The Procuring entity will review these Proposals and determine the extent to which they meet the required standards to complete the works.

5.1 Site Organization

[Insert Site Organization information]

5.2 Method Statement

[Insert Method Statement]

5.3 Mobilization Schedule

[Insert Mobilization Schedule]

5.4 Construction Schedule

[Insert Construction Schedule]

PART 2 - WORKS' REQUIREMENTS

SECTION V - BILLS OF QUANTITIES SCOPE OF WORKS

The following works are to be implemented

Laying of approximately 3.5 km OD180mm HDPE PN10-PN20 raw water main, complete with all necessary fittings and appurtenances.

Construction of a 225 m^3 masonry water storage tank.

Construction of run-off the river intake works.

Repainting and refurbishment of TWWDA Maji House.

Rehabilitation works on an existing 150m^3 masonry tank and installation of pipeline appurtenances.

PREAMBLE TO THE BILLS OF QUANTITIES GENERAL DIRECTIONS

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.

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.

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.

The method of measurement of completed work for payment shall be in accordance to the 'Civil Engineering Standard Method of Measurement" (CESMM4, Fourth Edition) published by the Institution of Civil Project Manager or his representatives, London, 30th May 2019.

Any condition contained in this Preamble shall be deemed to prevail in the event of contradiction with a condition contained in the above "CESMM4"

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 Project Manager or his representative 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.

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.

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

n.e.	=	Not exceeding
r.c.	=	Reinforced concrete
p.c.	=	Precast Concrete
HDPE	=	High Density Polyethylene Pipes

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.

Site Clearance and Demolition

The units of measurement shall be:

General Site Clearance square metres
General Site clearance for pipelines metre
Removal of trees and stumps number
Demolition of building and structures sum
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.

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

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 Project Manager or his representative before excavation is commenced and the lines, levels and profiles as shown on the Drawings, or as may be ordered by the Project Manager or his representative 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.

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 Project Manager or his representative.

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.

No measurement will be taken for material excavated beyond the limits and levels specified above.

Item Coverage

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

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

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 Project Manager or his representative. No extra payment will be made for additional material placed to allow for the effect of settlement.

Concrete and Reinforced Concrete

The units of measurement shall be:

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

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 Project Manager or his representative. No deductions in the measurement will be made for:

Mortar beds;
chamfers, ducts, chases, fillets, splays, drips, rebates, recesses, grooves and the like, not exceeding 0.005 square metres in cross sectional area;
Bolt holes, pockets, sockets, mortices and the like formed in the concrete not exceeding 0.1 cubic metres in volume.
Cast in components each less than 0.1 cubic metres in volume;
Reinforcement and other metal sections.

Item coverage:

No separate payment will be made beyond the rates for concrete for: -
Trial mixes (for Specification Classes of concrete only);
Supply of cement, water and processed aggregates;
Supply and placing of mortar beds or rendering as specified;
Mixing, transporting, placing, compacting, surface tamping to provide Ul finish, protecting and curing the concrete;
hacking, cleaning and roughening by wet sand blasting, scrabbling or other means concrete surfaces on or against which further concrete is to be placed;
Rubbing down faces;
Shuttering and waterstops to construction joints, not expressly required by the Project Manager or his representative, Keys and the like.
Providing samples and testing of materials and concrete;
Provision and use of admixtures;
Placing and compacting concrete around steel reinforcement and other cast in components;
Placing and compacting concrete at varying heights;
Creating falls, cambers and shaped profiles;
Formwork to edge of concrete in blinding layers;
All additional concrete to fill overbreak and/or working space;
Where concretes of different cement contents are required to be placed simultaneously in the same life of concrete;
Placing and compacting concrete to inclined or battered faces including any necessary upper surfaces formwork inclined at an angle of less than 15E to he horizontal.

Precast Concrete
The units of measurement shall be:

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

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.

Item coverage:

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

trial mixes;
reinforcement, cement and processed aggregates;
formwork, surface finishing, lifting devices and bearing plates;
forming sockets, holes, grooves, rebates recesses and ducts; and except where otherwise indicated,
handling, laying and fixing the units in position;
aligning members and units, adjusting levels and soffit profiles, and temporary fixing to prevent displacement;
Cutting and trimming copings, sills and the like to size.

Steel Reinforcement

The Units of measurement shall be:

Steel rod reinforcement kilogramme (kg)
Steel fabric reinforcement square metres
Steel dowels of stated diameter and length number
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 Project Manager or his representative 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.

Item coverage:

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

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

Formwork

The units of measurement shall be:

General formwork square metre
Formwork less than 300mm widemetre
Boxouts, pockets, etc. of stated size number
Rebates, chases, etc. of staged size metre

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:

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

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:

falsework, centering, fabricating, assembling, cutting, fitting and fixing in position and taking all measurement necessary to produce the required profiles;
forming cambers or falls;
linings and taking all measures necessary to produce the required finish to the surfaces of the concrete;
cutting and fitting around projecting members, pipes reinforcement and the like;
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.
Maintaining in place until it is struck and allowing for any variation from the minimum period for striking arising from prevailing weather conditions.
striking, taking down and removing;
Any additional concrete provided in lieu of formwork to fill overbreak or working space.

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.

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 Ul.

Breaking out Reinforced Concrete and Blockwork

The units of measurement shall be:

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

Method of measurement:

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.
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.

Item coverage:

No separate payment will be made beyond the rates for breaking out for:
All equipment necessary;
Any temporary supports, staging and the like;
Any overbreak;
Material for building in pipes and supporting the pipe;
Formwork;
Removal of broken out materials off site;
Cutting through reinforcement.

Pipes and Pipe work
The units of measurement shall be:
Pipelines :metre
Pipework, fittings and valves : number

Method of measurement:

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

Item coverage:

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

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

Pipework Ancillaries
The units of measurement shall be:

Beds, haunches and surrounds: metre
Concrete stools and thrust and anchor blocks: cubic metre

Method of measurement:

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.
Item coverage:

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

Excavation including working space;
Formwork type F1 finish;
Providing unshuttered surfaces to type U1.

Structural and Miscellaneous Metal Work

The units of measurement shall be:

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

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 Project Manager or his representative. No allowance shall be made in the measurement thereof for rolling margin and other permissible deviations from standard weights.

Item coverage:

No separate payment will be made beyond the rates for metal work for:
Cost of supplying materials;
moulding, fabricating, welding, drilling, machining, screwing, galvanizing or painting as may be specified.
Handling, transporting, hoisting, fitting and fixing in position complete;
supply of all fixings;
Painting after erection as specified;

Brickwork, Blockwork and Masonry

The units of measurements shall be:

Brickwork, blockwork and masonry not exceeding 1 metre in thickness square metres
Brickwork, blockwork and masonry exceeding 1 metre in thickness cubic metres
Damp proof courses, wall thickness stated metre
Method of measurement:

Volumes and areas measured for brickwork, blockwork and masonry shall include the volumes and areas of joints.
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.
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.
Areas shall be measured at the centre lines of brickwork, blockwork and masonry.

Item coverage:

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

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

Ties and reinforcement.

Roofing

The units of measurement shall be:

Galvanized corrugated sheet iron or proprietary sheet metal roofing SM
Translucent panels, extra over (i) above square metre

Method of measurement:

Roofing shall be measured net as the overall area of finished roofing.

Item coverage:

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

Cutting to length, waste and laps;
Fixings, flashing, ridges and closure pieces.

Doors and Windows

The unit of measurement shall be number.

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.

Refurbishment of Valves

Valves shall be refurbished as follows:-

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

Measurement and Payment for Gabions

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 Project Manager or his representative 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.

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 Project Manager or his representative. 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, over-heads and profit.

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.

(See attached Bill of Quantities in Excel format)

SECTION VI - TECHNICAL SPECIFICATIONS.

1.0 GENERAL REQUIREMENTS.

Introduction

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

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

1.1.1 Location

The site for the proposed works is in **Ndia constituency, Kirinyaga County.**

Scope of Works

The Works consist of **Construction of Kiamuchuku Water Project as described in the BOQ.**

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 Project Manager or his representative from time to time whether specifically mentioned or not into the clauses of this specification.

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.

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

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

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

Detailed Drawings shall take precedence over General Drawings.

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.

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 Project Manager or his representative, the Project Manager or his representative 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.

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 Project Manager or his representative will be sought and any decision given by the Project Manager or his representative will be final and binding upon the Contractor.

Quality and Approvals

The materials and workmanship shall be the best of their respective kinds and to the approval of the Project Manager. The words "to the approval of the Project Manager" shall be deemed to be included in the description of all items relating to design, construction, installation and materials and workmanship for the due execution of the Works.
The Contractor shall submit all data, details and samples as necessary and as reasonably requested by the Project Manager of all materials that the Contractor proposes to use in the Works. Method statements which adequately demonstrate the Contractor's proposed method of working, methods of maintaining safety and compliance with the Programme shall be submitted for the Project Manager's approval prior to the commencement of work on any area of the Site.
Where the Contractor is responsible for the preparation of Construction Documents to describe the permanent works such Construction Documents shall be approved prior to the procurement of any materials or commencement of any work to which the documents relate.
No materials, Plant or equipment shall be procured for the Contract and no work, permanent or temporary, shall commence without first obtaining the Project Manager's approval.
All materials, Plant and equipment supplied shall be designed for operation under the above-described conditions.

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 Project Manager or his representative.

Samples

Samples of all materials shall be deposited with the Project Manager or his representative and approved prior to ordering or delivery to site. The Project Manager or his representative 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 Project Manager or his representative.
All sampling of materials on the site must be done by or in the presence of the Project Manager or his representative. 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 Project Manager or his representative shall be removed and replaced at the Contractor's expense.

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 Project Manager or his representative 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 Project Manager or his representative at the Independent Laboratory.

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

Programme for the Execution of Works

In accordance with Clause 14 of the Conditions of Contract, the Contractor upon receiving Project Manager or his representative'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.

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.

The order in which it is proposed to execute the permanent works shall be subject to adjustment and approval by the Project Manager or his representative, and Contractor's price shall be held to include for any reasonable and necessary adjustment required by the Project Manager or his representative during the course of the works.

The Contractor shall carry out the contract in accordance with the programme agreed with the Project Manager or his representative, but he shall in no manner be relieved by the Project Manager or his representative'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.

Once the proposed programme is approved by the Project Manager or his representative, the Contractor shall not depart from the programme without the written consent of the Project Manager or his representative. 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 Project Manager or his representative in writing of such occurrences without delay and submit proposals for any necessary remedial measures, for which he shall obtain the Project Manager or his representative's approval before putting such measures into effect.

The Contractor shall furnish the Project Manager or his representative with a monthly statement of all works done on the contract and of all materials on site.

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 Project Manager or his representative.

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.

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 to 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 Project Manager or his representative.
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:-

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.

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.

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 Project Manager or his representative 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 Project Manager or his representative 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 Project Manager or his representative, 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 Project Manager or his representative'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.

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 Project Manager or his representative 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 Project Manager or his representative 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.

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

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 Project Manager or his representative'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 Project Manager or his representative immediately any existing service is exposed.

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 Project Manager or his representative or owner. The Contractor shall provide for these contingencies in the rates inserted in the Bills of Quantities.

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.

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.

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.

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.

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.

Protection from Weather

All materials shall be stored on site in a manner approved by the Project Manager or his representative 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.

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 Project Manager or his representative must be obtained before commencing any blasting operation.

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

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.

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.

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.

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 Project Manager or his representative has the right to order, who in the opinion of the Project Manager 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.

Medical Facilities

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

Signboards

The Contractor shall erect signboards as shown on the drawing in prominent positions adjacent to the works to the satisfaction of the Project Manager. The location of the signboards shall be specified by the Project Manager or his representative.

Setting Out and Survey Equipment

The Contractor must before commence 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 Project Manager or his representative, 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 Project Manager or his representative, provide approved new and accurate instruments together with all other requisites, all necessary chainmen and other attendance and transport required for setting out and checking the works or purpose in connection therewith.

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

	Description	No.
(a)	2 m ranging rods	6
(b)	Modern Real-Time Kinematic (RTK)	1
(c)	Total Station 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 Project Officer 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 Project Officer 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, Project Officer's office etc., to the permanent works for the approval of the Project Manager or his representative before commencing erection of his camp.

Backfilling of Holes and trenches

The Contractor shall immediately upon approval of any work at his own expense and to the satisfaction of the Project Officer 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.

Inspection of Works

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

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 Project Manager or his representative and shall leave the Site absolutely clear thereof and in good order and condition to the entire satisfaction of the Project Manager or his representative.

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 Project Manager or his representative 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 Project Manager or his representative. 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.

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 projection 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.

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 Project Manager or his representative 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.

Contractor's Superintendence

The Contractor shall give or provide all necessary superintendence during the execution of the works and as long thereafter as the Project Manager or his representative 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 Project Manager or his representative (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 Project Manager or his representative, 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 Project Manager or his representative.

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.

Normal Working Hours

The contractor shall inform the Project Manager or his representative 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 Project Manager or his representative in writing at lease 24 hours in advance for consideration.

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 licenses 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.

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.

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 Project Manager or his representative. The Contractor shall throughout the contract provide an adequate supply of potable water for the workmen.

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 Project Manager or his representative

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.

Office for the Project Manager or his representative's Representative

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

Housing for the Project Manager or his representatives Staff

The employer shall provide housing for Project Manager or his representatives Staff

Maintenance of the Project Manager or his representative's Staff Houses, Offices, Furniture and Equipment

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

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

Keep all buildings provided by him, for the use of the Project Manager or his representative 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 Project Manager or his representative.

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

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.

The Contractor shall provide day and night watchmen for the Project Manager or his representative'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 Project Manager or his representative'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 Project Manager or his representative 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).

Attendance upon Project Manager or his representative's Staff
For duration of the Contract.

The Contractor shall provide all assistance including laborers, chainmen, clerks and junior staff as and when required by the Project Manager or his representative for checking, setting out surveying measuring or for testing of work. The Contractor shall also provide a full time typist in Project Manager or his representative's office.

The Contractor shall provide all tools and protective clothing, wooden pegs, iron pins and pickets, water cement and aggregate for concreting, transport for laborers and materials as may be required by the Project Manager or his representative 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 Project Manager or his representative 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).

Insurance
All buildings, furniture and equipment provided by the Contractor for the Project Manager or his representative'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 Project Manager or his representative's staff houses.

Transport for Project Manager or his representative's Representative
The Employer shall provide transport for the Project Manager or his representative'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 Project Manager or his representative.

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

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 Project Manager or his representative.

1.52 Project Management

1.52.1 Project Control

The Contractor shall provide within his site organization a project management capability to advice and be directly responsible to the Site Agent. (Contractor's chief site representative) The duties of the section shall include the following:

Planning and programme preparation particularly in relation to the requirements of the Employer and the public authorities, and the requirements to maintain water supply and waste water disposal services where careful detailed arrangements have to be made and adhered to.

Planning the execution of the Works in a manner which minimizes disruption to the water supply system and will permit the efficient and effective commissioning of the water supply system and their respective components.

Ensuring adequate potable water supplies and wastewater disposal services are maintained to all consumers.

Continuous surveillance of progress and anticipation of factors likely to affect the timely performance of the Contract.

Making proposal for modification to forward planning and to the programme at an early stage in the light of factors resulting from (d) above.

Continuous appraisal of the Contractor's methods and routines particularly as to their effect on the community and property.

Forward planning for resource requirements taking due account of possible shortages and delays in the arrival on site of materials, equipment, plant and personnel and their mobilization for effective usage.

Acquisition and process of up-to-date information for progress meetings with the Project Manager. The preparation of monthly progress reports including an update of the detailed programme and cash flow forecast which shall include progress photographs as directed by the Project Manager.

The Contractor's project management staff shall be of adequate ability and experience. Programme shall be based upon Critical Path Management (CPM) networks in precedence format and shall be prepared using a suitable PC-based project management software package approved by the Project Manager.

Reporting shall be in a manner compatible with the Employers project management procedures and shall use the Earned Value (EV) Technique and shall monitor the actual gross value of work completed against the predicted value.

1.52.2 Monthly Statements and Certificates

Monthly statements and certificates shall be submitted in an approved manner and format. In addition to the statements submitted in hard copy the Contractor shall submit a computer copy using data base software as prescribed by the Project Manager.

The statements and certificates shall detail the measured value of the work completed on each item of the Works in such detail that the Project Manager can identify location and measurement of each item. A location shall constitute a single structure such as a reservoir, or section of a pipeline or a component of a system such as a pipeline valve complex.

Each item shall be uniquely identified in accordance with the numbering system as instructed by the Project Manager

1.52.3 Progress Meetings

The Contractor shall provide a suitable venue, near the vicinity of the Site, and arrange progress review meetings to be chaired by the Project Manager at monthly intervals to coincide with submission of monthly progress submissions.

The Contractor shall allow for attendance by the Project Manager and up to 4 representatives of the Project Manager's or Employer. The meetings shall be attended by the Contractor's senior representatives, Site Agent and other members of his senior staff as may be deemed necessary

2.0 EARTHWORKS, BACKFILLING AND RESTORATION.

2.1 Conditions of Site

Before carrying out work on any Site, the Site shall be inspected by the Contractor in conjunction with the Project Manager to establish its general condition which shall be agreed and recorded in writing and by means of digital photography.

Details recorded shall include the location of all boundary and survey beacons, the condition of buildings, surface, terracing (if any), ditches, watercourses, roads, tracks, fences and other information relating to the Site and elsewhere which may be affected by the works.

In the case of way leaves for pipelines the boundaries of the way leave will be defined by the Employer and the contractor shall where directed provide erect and maintain in position, from commencement to the final completion of the Works, in every section substantial timber stake or similar approved markers not less than 1.5 m high indicating the position of the boundary at 100m or other such intervals as the Project Manager may direct.

In the event of any boundary or survey mark established for the purpose of land title being disturbed or displaced the Contractor shall forthwith replace the beacon.

Where necessary the Contactor shall employ the services of an approved licensed surveyor for the purpose of setting out boundaries.

2.2 Site Clearance and Topsoil Removal

Site clearance shall be carried out over the areas to be occupied by the Permanent Works before beginning excavation or filling or other work, and shall include the clearance of all trees, stumps, bushes and other vegetation and the removal of all boulders between 0.01 and 0.2m3 volumes. Boulders located within 1m of any pipe centerline shall be removed where directed by the Project Manager.

Before beginning clearance in any area, the Contractor shall give seven days written notice of his intention to the Project Manager who will determine the extent and limits of such clearance.
Topsoil shall mean the surface layer of soil which by its humus content supports vegetation and is unsuitable, as a formation to roads and concrete structures or as a backfill or bedding material. The extent and depth of topsoil that needs removal shall be agreed with the Project Manager. Topsoil shall be set aside for re-use or disposal as directed by the Project Manager.

Trees to be removed shall be uprooted or cut down as near to the ground level as possible. Bushes, undergrowth, small trees stumps and tree roots shall, where directed by the Project Manager, be grubbed out. All holes left by the stumps or roots shall be backfilled with suitable material in a manner approved by the Project Manager.

The Project Manager may require that individual trees, shrubs and hedges are preserved; the Contractor shall take all necessary precautions to prevent their damage.

In the case of way leaves for pipelines and the like, the Contractor shall preserve as far as practicable all grass and other vegetation outside the limits of trenches and permanent works and shall not necessarily destroy crops or any vegetation whose removal would not be essential to his operations.

2.3 Erosion

The Contractor shall take care at all times to prevent erosion on every site and elsewhere on land which may be affected by his operations and the Project Manager may impose such reasonable limitations and restrictions upon the method of clearance and upon the timing and season of the year when clearance is carried out as the circumstances warrant.

2.4 Ground Levels

Before commencement of any earthworks or demolition the sites shall be surveyed, as necessary, in conjunction with the Project Manager to establish existing ground levels. These agreed ground levels

shall form the basis for the calculation of any subsequent excavation and filling.

2.5 Trial Holes

The Contractor shall excavate refill and restore in advance of his programme such trial holes as he may require for determining the nature of the subsoil and the location of existing underground services and obstructions.

2.6 Excavation Generally

Excavations shall be made in open cutting unless tunnelling or heading is specified or approved by the Project Manager and shall be taken out as nearly as possible to exact dimensions and levels so that minimum of infilling will afterwards be necessary. The Contractor shall ensure the stability and safety of excavations and shall take all measures necessary to ensure that no collapse or subsidence occurs.

Except where described in the Contract or permitted under the Contract excavation shall not be battered. The sides of all excavations shall be kept true and shall where necessary be adequately supported by means of timber, steel or other type struts, walling, poling boards, sheeting, bracing and the like.

Excavations shall be kept free from water and it shall be the Contractor's responsibility to construct and maintain temporary diversion and drainage works and to carry out pumping and to take all measures necessary to comply with this requirement.

In the event of soft or otherwise unsuitable ground being encountered at formation level or if the formation is damaged or allowed to deteriorate the Contractor shall forthwith inform the Project Manager, shall excavate to such extra depth and refill with compacted granular or other approved fill or C15 concrete (minimum compressor strength 15N/mm2) as the Project Manager may require. With respect to the side face of any excavation against which concrete or other work will be in contact the Project Manager may require that the net dimensions of the work be increased.

The Contractor shall be responsible for the disposal of Surplus excavated material off site, which shall be to a location approved by the Project Manager. No excavated material suitable for re-use shall be removed without the approval of the Project Manager.

The Contractor shall not deposit excavated materials on public or private land except where directed by the Project Manager or with the consent in writing of the relevant authority or of the owner or responsible representative of the owner of such land and only then in those places and under such conditions as the relevant authority, owner or responsible representative may prescribe.

2.7 Excavation in Excess

If any part of any excavation is in error excavated deeper and/or wider than is required the extra depth and/or width shall be filled with Grade C15P concrete or compacted granular or other approved fill to the original formation level and/or dimensions as the Project Manager directs.

In pipe trenches where the pipe is not bedded on or surrounded with concrete, excess excavation shall be filled with compacted granular material. Excess excavation in rock trenches shall be filled with concrete (15N/mm2 compressive strength) up to 150mm below the pipe invert.

2.8 Mechanical Excavation

Mechanical excavation shall be employed only if the subsoil is suitable and only in such manner which will allow adequate support of the excavations. The Contractor shall ensure that there are no pipes, cables,

mains or other services or property which may be disturbed or damaged by its use.

2.9 Excavation for Pipe laying

The width of trench excavation shall be the minimum required for efficient working after allowance has been made for any timbering and strutting, and shall not exceed the widths described in the Contract. At any one spread the maximum length of open trench shall not, without the prior approval of the Project Manager, exceed 100 metres.

Trenches in rock for pipes up to 100mm bore shall be excavated to provide a minimum clearance of 100 mm around the outside of the pipe and joints. For pipes exceeding 100mm bore the minimum clearance shall be increased to 150mm.

Where the trench is in rock or rocky ground the Contractor shall excavate the pipe trench to a depth of 150mm below the invert of the pipe and refill with compacted granular fill.

The materials for re-use excavated from trenches shall be stockpiled at the sides of the trench except where this would obstruct any road or footpath and prevent the passage of traffic or pedestrians. In such cases the Contractor shall excavate the trench in such lengths and stockpile the excavated materials at such places as the Project Manager may require.

Where excavation for pipe laying is carried out behind thrust blocks on existing pipelines the Contractor shall provide adequate support arrangements to transfer thrusts to the surrounding ground.

2.10 Headings

Excavation for pipes in heading shall be carried out to the approval of the Project Manager and to dimensions which will permit a proper inspection to be made. The heading shall be properly and securely timbered.

The pipe shall be laid on a minimum thickness of 150mm of concrete. After the pipe has been laid, jointed and tested the heading shall be filled in short lengths not exceeding 1 metre with Grade C15P concrete or as directed.

The heading shall be completely filled with concrete and hard filling shall then be rammed into the concrete at the crown of the heading.

Special precautions shall be taken to prevent a slump in the concrete and to ensure that no slips or falls of the heading or in the ground above or in the shafts can take place.

2.11 Excavation for Foundations of Structures

The Contractor shall give sufficient notice to the Project Manager to enable him to inspect and approve foundations in advance of placement of the permanent works. The Project Manager may withdraw his approval if work is not commenced within 48 hours or the formation is subsequently allowed to deteriorate.

If the Project Manager directs a bottom layer of excavation of not less than 75mm thickness shall be left undisturbed and subsequently taken out by hand immediately before concrete or other work is placed.

Formations which are to receive concrete blinding or a drainage layer shall be covered with such

blinding or layer immediately the excavation has been completed, inspected and approved by the Project Manager. Surfaces against which permanent works are to be placed shall be kept free of oil, water, mud or any material.

No concrete or other materials shall be placed until formations have been approved. Adequate notice shall be given to the Project Manager to enable him to examine the formation.

2.12 Rock Surfaces under Concrete Structures

2.12.1 Concrete Placed Directly on Rock

Rock under concrete structures shall be prepared by picking, barring and wedging or other methods which will leave the rock in as sound a condition as may reasonably be expected according to the rock quality.

Rock surfaces shall be thoroughly cleaned by compressed air and water jet or such means as the Project Manager my direct before concrete is placed.

2.12.2 Concrete Placed on Capping Layer

Where instructed the rock excavation shall be taken down to a depth of 1.0m below the underside of the structure and the excavation backfilled with capping materials to the required formation level. Capping material shall be granular material.

The material shall be compacted in 150mm layers to achieve a density of not less than 95% maximum dry density at optimum moisture content + 5% to 2% as determined by the BS heavy compaction tests to BS 1377.

2.13 Explosives

The Contractor shall at all times take every possible precaution and comply with the Explosives Laws of Kenya and regulations relating to the handling, transportation, storage and use of explosives and shall at all times when engaged in blasting operations post sufficient warning flagmen to the full satisfaction of the Project Manager's Representative.

The Contractor shall also provide a special proper store for explosives in accordance with local regulations and shall provide experienced men with valid blasting licenses, for handling explosives to the satisfaction of the Project Manager and the authorities concerned.

The Contractor shall at all times make full liaison with and inform well in advance and obtain such supervision and permission as is required from the Police and all Government Authorities, public bodies and private parties whosoever concerned or affected by blasting operations.

Blasting shall only be carried out on those sections of the Works for which permission in writing shall have been given by the Project Manager and the relevant authorities and shall be restricted to such hours and conditions as may be prescribed. Blasting within 10 metres of existing water mains will not be permitted.

Blasting shall be carried out so as not to weaken existing structures or the foundations or ground adjacent to the existing and proposed works. The Contractor shall take all necessary precautions to prevent loss, injury or accident to persons or property and shall be entirely liable for any accident or damage that may

result from the use of explosives.

The Contractor shall submit to the Project Manager for his approval a method statement including details of the intended drilling patterns, depths of holes, the amounts of explosives at each location and the method or sequence of setting off that he proposes to use.

2.14 Excavated Materials Suitable for Re-use

In so far as they are suitable and comply with the Specification, materials arising from excavations shall be re- used in the Works.

During excavation, the Contractor shall ensure that all material suitable for re-use are kept separate and set aside and protected as necessary to prevent loss or deterioration.

The materials forming the surface and foundations of roads, road verges, tracks and footways shall when excavated, and if required for further use, be carefully separated. All hard materials shall be kept free from soil or other excavated materials.

During excavation of pipe trenches the Contractor shall ensure that all granular or other approved material suitable for filling around and over pipes shall be kept separate and re-used for this purpose.
Paving slabs, bricks and similar surfaces shall be carefully removed and stacked. Prior to the commencement of excavation the number of badly broken and unsuitable paving slabs, bricks etc. on the line of the excavations shall be agreed with the Project Manager.

In verges and other grass surfaces the grass and top soil shall be stripped and separately stacked.

2.15 **Backfilling of Excavations**

Backfilling shall be thoroughly compacted in layers not exceeding 150mm compacted thickness and by means which will not damage the Works.

Backfilling of reinforced concrete structures shall be with suitable material approved by the Project Manager.

“Granular material” as backfill is defined as unconsolidated quarry dust, gravel, sand or similar in which the clay or silt content is not predominant. The use of angular crushed stone shall not be permitted.

2.16 Pipe Beddings

Unless otherwise specified granular material for beddings shall consist of aggregate to BS EN 12620 and shall conform to the following grading.

Pipe Diameter (mm)	Nominal Max Size (mm)	Grading (mm)
<50	sand	N/A
50	10	10 single-size
80	10	10 single-size
100	10	10 single-size
150	15	10 or 14 single-size or 14 to 5 graded

200 to500	20	10, 14 or 20 single-sized or 14 to 5 graded or 20 to 5 graded
<500	40	10,14 20 or single-size crushed rock or 14 to 5 graded

or 20 to 5 graded
or 40 to 5 graded

Granular bedding material where specified shall have a Compaction Fraction not greater than 0.3 as ascertained by the test method described below.

Aggregates for flexible pipes shall consist of sub-rounded or rounded material which will not cause damage to or penetrate the pipe material.

Sand bedding material shall consist of approved local sand which material shall have a Compaction Fraction ascertained by the test method described below of not greater than 0.3.
Class A bedding shall consist of Grade C15P concrete bed and surround.

Class A1 bedding shall comprise a 120 degrees cradle of Grade C15P in-situ un-reinforced concrete under the pipe with selected backfill material to a depth of 300mm above the crown of the pipe.

Class B bedding shall comprise a 180 degrees bed of single-size granular material in accordance with the above table, with selected backfill material to a depth of 300mm above the crown of the pipe.
Class S bedding shall comprise a complete surround of granular material in accordance with the above table to a depth of 150mm above the crown of the pipe.

Class D bedding shall comprise a hand-trimmed natural bottom to the trench with selected backfill material placed around and over the pipe to a depth of 300mm above the crown of the pipe.

Granular bedding and selected backfill material, placed around and to a thickness of 300mm above the crown of the pipes shall be placed simultaneously on both sides of the pipe in layers not exceeding 150mm thickness and compacted by the use of hand rammers taking particular care to compact the material under barrel of the pipe and around joints.

In trenches where there is a continuous accumulation of groundwater, the trench shall after obtaining the approval of the Project Manager, be over-excavated by 150mm and shall be backfilled using compacted granular material in accordance with the above table.

If the quantity of suitable material which can be obtained from the excavations is insufficient, the Contractor shall either screen the excavated material or transport suitable material from other excavated or borrow pits on the Site. In cases where insufficient material exists on the Site, the Contractor shall import suitable material after obtaining the written approval of the Project Manager.

2.17 Compaction Fraction Test

2.17.1 Apparatus required:

Open-ended cylinder 250 mm long and 150mm ± 5mm internal diameter (150mm diameter pipe is suitable);

Metal hammer with striking face 38 mm diameter and weighing 1 kg.
Rule.

2.17.2 Method

Obtain a representative sample, more than sufficient to fill the cylinder (viz. about 10kg). It is important that
the moisture content of the sample should not differ from that of the main body of material at the time of its use in the trench.

Place the cylinder on a firm flat surface and gently pour the sample material into it, loosely and without tamping. Strike off the top surface level with the top of the cylinder and remove all surplus material. Lift the cylinder up clear of its contents and place on a fresh area of flat surface. Place about one quarter of the material back in the cylinder and tamp vigorously until no further compaction can be obtained. Repeat with the second quarter, tamping as before, and so on for the third and fourth quarters, tamping the final surface as level as possible.

Measure down from the top of the cylinder to the surface of the compacted material. This distance in millimetres divided by the height of the cylinder (250mm) is the Compaction Fraction of the material under test.

To obtain a representative sample about 50kg of the proposed material should be heaped on a clear surface and divided with the spade down the middle into two halves. One of these should then be similarly divided, and so on until the required weight sample is left.

2.18 Selected Backfill Material

Backfill in contact with the pipes shall be selected material and shall not contain larges stones, rocks, tree roots or similar objects which through impact or by concentrating imposed loads might damage the pipes. The material shall be capable of being compacted without the use of heavy rammers and should be free of clay lumps or other material larger than 745mm or stones larger than the maximum particle size specified for pipe bedding.

2.19 Backfilling of Pipe Trenches

The trench above pipe bedding level (300mm above the crown of the pipe) shall be filled with the approved back fill material obtained from the trench excavations, free from clay limps, boulders and rock fragments larger than 150mm.

If the quantity of material which can be obtained from the pipe trench excavation is insufficient, the Contractor shall either screen the excavated material or transport suitable material from other excavations or borrow pits on the Site. In cases where insufficient material exists on the Site, the Contractor shall import suitable material after obtaining the written approval of the Project Manager.
The material shall be placed in layers not exceeding 150mm thickness and compacted by the use of rammers to achieve a density of not less than 95% maximum density at optimum moisture content +5% to -2% as determined by the BS Heavy Compaction Test to BS 1377.

For trenches in fields and open areas where agreed by the Project Manager the trench backfill shall be compacted to obtain a density of not less than 85% maximum dry density at optimum moisture content +5% to -2% as determined by the BS Heavy Compaction Test to BS 1377.

The density of the compacted fill shall be determined by the Contractor using the “sand replacement”

method as directed by the Project Manager.
Before backfilling trenches the Contractor shall obtain approval from the Project Manager of the methods he proposes to use and shall demonstrate by means of tests that the specified compaction can be achieved. The method of compaction shall at all times be to the approval of the Project Manager.
Where ground water conditions are such that the bedding material would be likely to act as a carrier for ground water from higher of lower ground, the Project Manager may instruct flow barriers of suitable selected earth or concrete to be inserted in lieu of bedding material. Such barriers to be erected at reasonable intervals close to flexible joints in the pipe.

2.20 Making Good Subsidence after Backfilling

Backfilling, whether in foundations or in pipe trenches, shall be thoroughly compacted by ramming and any subsidence due to consolidation shall be made up with extra compacted material.

Should subsidence occur after any surface reinstatement has been completed the surface reinstatement shall first be removed, the hollows made up, and then the surface reinstatement re-laid.
Any subsidence that occurs adjacent to the Site of the Works which is attributable to the Contractor's activities shall be reinstated to the full satisfaction of the Project Manager.

2.21 Removal of Timbering from Excavations

Timbering shall be removed from the excavations before or during the process of backfilling except in so far as this removal of timber would be likely to cause damage to adjacent property, structures or structure foundations in which event the Contractor shall leave in the excavation such timbering as he considers necessary or as may be ordered by the Project Manager.

2.22 Reinstatement of Surfaces

All surfaces whether public or private that are affected by the Works shall be reinstated temporarily in the first instance and when the ground has consolidated fully the Contractor shall reinstate the surfaces permanently.

Temporary reinstatement and permanent reinstatement of all surfaces, affected by the operations of the Contractor shall be carried out and maintained to the satisfaction of the Project Manager and the responsible authority or owner.
Temporary reinstatement shall be carried out immediately the trenches are backfilled. Permanent reinstatement shall not be carried out until the ground has consolidated completely. The Contractor shall inform the Project Manager before carrying out this work. In the event of further settlement occurring after completion of the permanent reinstatement the Contractor shall forthwith make good the reinstatement to the approval of the Project Manager or responsible authority.

For the purpose of temporary and permanent reinstatement in bitumen and surfaced roads the surface width of trenches shall be increased by 150mm on each side of the trench for a depth of 75mm to provide a solid abutment for the surfacing material.

Reinstatement of surfaced roads shall be carried out to the approval of the relevant authority.
The responsible authority shall have the right to carry out permanent reinstatement at the Contractor's expense. Trenches in open ground shall be reinstated to the condition in which the ground was before excavation was commenced. The final surface of the trench shall be flush with the surrounding ground.
In verges and other grass surfaces and after the backfilling had been thoroughly consolidated the topsoil shall be re-laid rolled and planted with grass or other vegetation as directed by the Project Manager as may be necessary and watered until the grass has become well established. Should the planting fail it

shall be replanted as required until satisfactory growth is obtained. If at any time any reinstatement deteriorates the Contractor shall restore it to a proper condition immediately.

Should the Contractor not remedy the defect to the Project Manager's satisfaction forthwith any remedial work considered necessary may be undertaken by the Employer and/or the responsible authority at the Contractor's expense.

All trees, shrubs and plants shall be carefully transplanted and shall be returned to their original location after the refilling of the excavations. Return of old or mature trees may be waived in cases where the age of the tree makes return impracticable, and approved tree seedlings shall be planted in their place. Topsoil shall be carefully set aside and replaced at the surface of the backfilling.

The trenches shall be refilled and rammed solid as specified in the Contract and shall not be topped up above the original surface level to allow settlement.
If any trench becomes dangerous the Project Manager may call upon the Contractor for its reinstatement at three hours' notice and failing this to have the work done by others at the Contractor's expense.

In the case of footpaths the trench shall be refilled and rammed as specified to within 125mm of the surface. A foundation layer of 100mm compacted thickness of approved crushed limestone shall then be laid and compacted. The surface shall be cleaned and primed and the footpath surfacing shall be temporarily reinstated with 25mm compacted thickness of 14 mm nominal size dense wearing course macadam laid and compacted so as to achieve a dense, smooth and even course surface using a roller of 750 to 3000kg mass. Any kerbs shall be reinstated to their original condition.
The trench surface shall be thus maintained until the end of the Period of Maintenance or permanent reinstatement is ordered by the Project Manager. Where permanent reinstatement is ordered by the Project Manager the temporary surface and part of the foundation shall be removed to 50mm depth to permit the construction of a tiled or paved surface to match the original surface. An approved tiled or paved surface shall then be laid and bedded on sand or mortar to an even finish.

2.23 Safety of Excavations in Roads

Where the surface of the road (other than that which lies immediately above the trench) is damaged either by the concentration of traffic caused by an open trench, by subsidence or other causes arising from the operations of the Contractor, he shall permanently reinstate the whole of the surface so damaged to its original condition.
The Contractor shall ensure that trenches and reinstatement are maintained in a safe condition and shall take immediate action to remedy any deterioration which renders the works unsafe. If in the opinion of the Project Manager any excavation or reinstatement is in a dangerous condition the Contractor shall immediately remedy the defect. Should the Contractor fail to carry out the reinstatement promptly the work any be carried out by others at the Contractor's expense.

2.24 Temporary Reinstatement of Asphalted Roads

In all asphalted or bitumen sprayed roads the trenches shall be refilled and compacted to the underside of the original road surface. A sub-base layer shall then be laid consisting of approved free drainage granular material conforming to the following grading limits:

100% by weight passing 50mm sieve 75-95 by weight passing 25.4mm sieve 40-75 by weight passing 9.51mm sieve 30-60 by weight passing 4.75mm sieve 20-45 by weight passing 2.0mm sieve 15-30 by weight passing 425mm sieve 5-15 by weight passing 72mm sieve.

A base layer shall then be laid consisting of approved crushed limestone material conforming to the following grading limits.

100%	by weight	passing 50mm sieve
60% - 80%	by weight	passing 20mm sieve
25% - 40%	by weight	passing 5mm sieve

The materials shall have a plasticity index of not exceeding 6%. The materials forming the sub-base and foundation shall be laid in layers, brought to optimum moisture content and compacted to 95% of the maximum dry density as determined by Part 4 Clauses 3.3/3.4 BS 1377:1990.

Prior to application of the temporary reinstatement the surface of the road foundation shall be cleared of all dust, debris and other deleterious matter and shall then be primed with one application of prime coat MC-70 or similar approved. All joints with adjacent road surfacing shall be cut straight and vertical and primed.

The road surfacing shall be temporarily reinstated with 25mm finished thickness of asphaltic concrete. The asphaltic concrete shall be laid and compacted so as to achieve a dense smooth and even surface using a roller of not less than 12 tonne mass.

The surface shall be maintained until the end of the period of Maintenance or until instructions are given for the permanent reinstatement to be carried out. The surface shall not be topped up above the original surface level to allow for settlement.

2.25 Temporary Reinstatement of Unmade Roads

In all unmade roads the trenches shall be refilled and compacted as specified in the Contract to within 150mm of the surface.
The trench shall be surfaced with 150mm compacted thickness of base layer material as specified above.

The surface shall be maintained until the end of the Period of Maintenance and shall not be topped up above the level of the original surface to allow for settlement.

2.26 Permanent Reinstatement of Asphaltic Roads

Where instructions are given that permanent reinstatement is to be carried out then the temporary asphaltic concrete surface and part of the foundation layer shall be removed to a minimum depth of 200mm and the surface of the foundation shall be rolled, all dust and debris removed, joints cut straight and vertical.
The permanent reinstatement shall comprise crushed limestone material to a total compacted thickness of 150mm and the wearing course 50mm compacted thickness of 14 mm nominal size dense wearing course asphaltic concrete. The laying and finishing of the coated macadam shall be carried out so as to achieve a dense, smooth and even surface using a roller of not less than 12 tonnes mass.

2.27 Forming Banks and Filled Areas

The filling to be used in the embankments and filled areas shall be material selected from that arising from surplus excavation (unless otherwise defined in the Particular Specification), the material being placed according to its nature as shall be directed by the Project Manager. The fill shall be placed in layers not exceeding 150mm thick, each layer being thoroughly compacted by an approved roller to the satisfaction of the Project Manager.

2.28 Restoration of Borrow Areas, Spoil Tips and Quarries

Any spoil tips, quarries or other borrow area developed by the Contractor for the purpose of the Works shall be finished to safe and fair slopes to the approval of the Project Manager.

2.29 Top-soiling and grassing

Where required surfaces shall be soiled with fine sifted soil or silt not less than 100 mm compacted thickness which shall be raked and brought to a fine tilth.

Surfaces required to be grassed shall be planted with approved local grass at a spacing of 200mm x 200mm. The grassed area shall be replanted if the first or subsequent operation is unfruitful or if for any reason the grass is destroyed. Grassed areas shall be watered and attended until the grass has become well established.

The soiling and planting of the grass in slopes shall be carried out immediately the slope is formed and the grass shall be kept weeded and cut until the work is accepted at the time of the Certificate of Completion.

The Contractor shall supply attendance during the Defects Liability Period to ensure that all planted grass is kept weeded and cut, and if necessary watered.

2.30 Free Draining Fill

Free draining fill for use as backing to wall shall consist of sound hard stone or broken rock or concrete derived from demolition of structures. The particles shall be roughly cubiform and shall be between 75mm and 25mm in size. All smaller particles, Dust, rubbish and organic matter shall be excluded.

2.31 Hardcore

Hardcore shall consist of sound hard stone or broken rock or concrete derived from excavations or demolition of structures and shall be graded from 150mm to 50mm in size, except that sufficient but not excessive blinding materials of smaller sizes may be permitted at the discretion of the Project Manager.

CONCRETE WORKS

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

3.1 Materials and Tests.

3.1.1 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 Project Manager or his representative.

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.

3.1.2. Aggregates for Concrete

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

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

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

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

Should the Project Manager or his representative 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.

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 Project Manager or his representative. The Contractor may be requested to provide test analysis according to BS 3148 from an approved laboratory.

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 Project Manager or his representative. The Contractor must request supply all details of any admixture.

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/m³	0.5
15	40 mm	250 kg/m³	0.5
20	20 mm	350 kg/m³	0.5
25	14 mm	390 kg/m³	0.5

Trial Mixes

The actual concrete mixes shall be determined prior to starting of concrete works according to BS 8110.
For each grade of concrete three separate batches shall be made using the actual aggregates. The workability of each of the trial batches should be determined and two times three cubes made from each batch for test at 7 days and 28 days.
The average strength of the nine cubes shall exceed the following values

Concrete grade	Minimum average of 9 cubes At 7 days	Minimum average of 9 cubes at 28 days
20	21 N/mm²	31.5N/mm²
25	24.5N/mm²	36.5 N/mm²

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

3.1.7. 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 Project Manager or his representative 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 Project Manager or his representative 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 Project Manager or his representative 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 Project Manager or his representative 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.

3.1.8 Standards for Acceptance of Cube Tests.

The results of all cubes shall be accepted by the contractor and Project Manager or his representative 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.

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 Project Manager or his representative, 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 Project Manager or his representative.

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 Project Manager or his representative may determine.

3.3 Precast Concrete Units

Precast concrete shall be cast in properly made strong moulds true to the shape required. For work described "Finished Fair" the moulds shall be lined hardboard, sheet metal or other approved material.
The Concrete shall be thoroughly tamped in the moulds and shall not be removed from then until 7 days after placing the concrete, but the sides may be removed after 3 days, provided the moulds are such that the sides are easily removable without damaging the concrete.

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

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

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

3.4 Workmanship

3.4.1. Inspection of Reinforcement and Formwork

No concreting shall commence until the reinforcement and formwork have been inspected and approved by the Project Manager or his representative, 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 Project Manager or his representative and obtain his approval.

Mixing of Concrete

Concrete for grade 20 and grade 25 shall be mixed by weight batching only, unless approval has been obtained from the Project Manager or his representative for the concrete materials to be mixed by volume. Concrete for grade 10 and 15 can be mixed by volume.
The weight of coarse and fine aggregates in each batch shall be so computed that each batch contains one or more full 50 kg bags of cement.

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

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

On the completion of each mixed batch of concrete, the mixer drum shall be completely emptied before a fresh batch is placed therein. On the cessation of work, the mixer add all handling plant shall be washed out and shall always be left clean and free from hardened concrete.
Any mix considered to be unsatisfactory by the Project Manager or his representative for any reason, will be discharged to waste at the Contractor's expense, as and where directed by the Project Manager or his representative, 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.

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 place dint he 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 Project Manager or his representative.

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 Project Manager or his representative

The concrete shall be paced in layers as directed by the Project Manager or his representative 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.

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 Project Manager or his representative. The Concrete shall be worked well up against the form, joints and around the reinforcement and be free form 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 cy an approved external vibrator.

Placing of Concrete under Water
Concrete shall only be placed under water with the prior approval of the Project Manager or his representative 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.

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

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 Project Manager or his representative.

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 Project Manager or his representative before commencement of work, and fixing and jointing of water bars shall be approved by the Project Manager or his representative before commencement of work, and fixing and jointing of water bars shall be approved by the Project Manager or his representative 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 Project Manager or his representative 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 Project Manager or his representative. 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 Project Manager or his representative 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.

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.

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 smoothened 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.

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 shattering, no concrete surfaces shall be treated in any way until they have been inspected by the Project Manager or his representative.

If upon removal of the shuttering, the line or surface of the work is, in the opinion of the Project Manager or his representative, 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 Project Manager or his representative directs.

Rendering over defective surfaces shall not be permitted. Areas of honeycombing shall with the approval of the Project Manager or his representative 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.

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 measurers required by the Project Manager or his representative to rectify work which is not constructed within the tolerance set out above.

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 Project Manager or his representative. 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 Project Manager or his representative'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 Project Manager or his representative 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 Project Manager or his representative, 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 Project Manager or his representative.

Mould Oil

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

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 Project Manager or his representative 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 Project Manager or his representative and details of fixtures or fixings to be cast in must be approved.

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 jto 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 hold 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.

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 though premature loading shall be entirely reconstructed at the Contractor's expense. The Project Manager or his representative may delay the time of removal of formwork if necessary. Subject to the above, the minimum period for removal of formwork shall generally be as follows:

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

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

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 Project Manager or his representative 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 Project Manager or his representative, 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 Project Manager or his representative.

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 so 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 Project Manager or his representative's approval of the reinforcement when places, before any concreting is commenced.

BUILDERS WORK.

Concrete Block Walling.

4.1.1 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/mm^2, 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 Project Manager or his representative.
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.

4.1.2 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.

4.1.3 Cement.

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

4.1.4 Sand.

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

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.

Damp-proof course.

All damp-proof courses shall be of bituminous felt to BS 743 weighing not less than 3 Kg per m^2, 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.

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.

Block work Tanks.
The concrete blocks shall be solid, type A with a minimum compressive strength of 7 N/mm^2, 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.

Plasterwork and other Floor, Wall and Ceiling Finishes.

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

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.

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.

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.

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.

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.

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.

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 Project Manager or his representative, after which all work executed shall conform with the respective approved samples.

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 Project Manager or his representative and any work not complying with the above shall be hacked away and replaced at the Contractor's expense.

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

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.

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.

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.

Cement rendering.

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

Protection.

All work shall be adequately protected against damage, to the satisfaction of the Project Manager or his representative until the works are handed over to the Project Manager or his representative.

Carpentry and Joinery

4.3.1 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:

Standard Common Name	**Botanical Name**
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 Project Manager or his representative, 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%.

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 Project Manager or his representative.

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.

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 Project Manager or his representative 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 wrap, 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 Project Manager or his representative 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 planning 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 Project Manager or his representative 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.

Inspection and Testing.

The Project Manager or his representative 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 Project Manager or his representative 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.

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.

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.

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.

Protection.

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

Steelwork.

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 Project Manager or his representative 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 Project Manager or his representative.

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.

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 Project Manager or his representative. The Project Manager or his representative'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 Project Manager or his representative 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.

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.

Ironmongery and other Fittings.

All ironmongery shall be approved by the Project Manager or his representative. The approved samples shall be regarded as the standard for work.

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 Project Manager or his representative.

Sanitary Fittings.

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

Glazing.

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.

Cleaning.

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

Painting, Decorating and other Surface Treatment.

Approved Specialist.

All work under this trade must be executed by an approved specialist unless the Project Manager or his representative agrees otherwise. Paint shall be of approved manufacture.

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.

Painting generally.

All paint, including primers, undercoats and finishings, polish, emulsion etc., to be used shall be obtained ready for use from the manufacturer approved by the Project Manager or his representative.

The Contractor shall order direct from the manufacturer and only fresh paint will be allowed to be used.

All paints shall be of the qualities, i.e. exterior, interior etc., types and colors scheduled. All coats of paint system shall be obtained from the same manufacturer, shall be ordered for use together and as far as practicable, shall be ordered on one order in sufficient quantity for the whole of the work, particularly in the case of the finishing color. Where more than one of the three systems (gloss, semi-gloss or flat) is in use, these paints shall be used in strict accordance with their accompanying printed instructions.

The Contractor shall use only paints delivered to the site in original sealed containers, not exceeding five litre capacity, stamped and bearing the manufacturer's name of mark, the specification number, method of application (e.g. brushing) color, quantity, batch number and date of manufacture, and expiry.

Contractor's stocks shall not be accepted unless expressly approved by the Project Manager or his

representative's Representative.

The paint, which will be subject to sampling and testing, shall be used exactly as received, after adequate stirring, without the addition of thinners, driers, or adulterating materials of any kind.

All tints and shades (including colors of undercoats) shall be selected and approved by the Project Manager or his representative's Representative and the Contractor shall allow in his prices for executing the painting work in color schemes, to be prepared from a wide range of colors.

All paints described as oil paint shall be alkyd paint.

No painting on exterior work shall be carried out in wet weather or upon surfaces which are not thoroughly dry. Painting shall not proceed in dusty conditions. Each coat of paint shall be thoroughly dry and shall be rubbed down with glass paper before a subsequent coat is applied. Adequate care must be taken to protect surfaces of paintwork, still wet.

Lead based priming paints for steelwork shall conform to B.S. 2521 and 2523.

Samples.

The Contractor shall furnish at the earliest possible opportunity before work commences and at his own cost, samples of painting for the Project Manager or his representative'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 Project Manager or his representative, 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 Project Manager or his representative.

The Project Manager or his representative 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.

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.

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

Project Manager or his representative, 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.

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.

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.

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

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.

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

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.

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

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.

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

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.

5.0 PIPEWORK

5.1 General

5.1.1 Equivalency of Goods, Materials and Plant

Wherever reference is made in the Contract, including Specifications, Drawings and Bill of Quantities, to specified manufacturers or suppliers for the supply of goods, materials and plant for the Works, goods, materials and plant from alternative manufacturers and suppliers will be permitted, unless otherwise expressly stated in the Contract, providing these other goods, materials and plant are substantially equal or of a higher quality than those of the specified manufacturer or supplier and are approved in writing by the Project Manager.

Differences between the specified goods, materials or plant and the proposed alternative shall be described in writing by the Contractor and submitted to the Project Manager, together with such manufacturers or supplier's technical literature and samples as the Project Manager may reasonably require.

At least 28 days prior to the date when the Contractor desires the Project Manager's consent. In the event the Project Manager determines that such proposed alternative goods, materials or plant do not ensure substantially equal or higher quality, the Contractor shall obtain the goods, materials or plant from the manufacturer of supplier specified in the Contract.

5.1.2 Materials

Any material which will come into contact with potable water or water to be used for potable supply shall comply with the UK regulations on the use of materials for potable water supply.

Water Supply (Water Quality) Regulations 1989 and 15th Statement of the Department of Environment Committee on Chemical and Materials of Construction for use in public water supplies and swimming pools, published by the Department of the Environment, UK or national standards adopted for use in Kenya.

5.1.3 Approval

As soon as possible after commencement of the Contract, the Contractor shall submit to the Project Manager for his approval a list of his proposed suppliers, sources of materials and proposed standards.

No materials, plant or equipment shall be procured for the Contract without first obtaining the Project Manager's approval. Samples of materials shall be submitted to the Project Manager for approval as required by the Project Manager.

Materials subsequently supplied shall conform to the quality of the samples which have been approved by the Project Manager.

No standards, method of manufacture or specification shall be changed without the approval of the Project Manager.

Where possible, plant shall be supplied to the same standards or to compatible standards.
The Contractor shall provide secure storage for all samples submitted to the Project Manager.

5.1.4 Dimensions

Plant and materials shall be supplied to the general arrangements and dimension, or to suit the dimensions, shown on the Drawings or otherwise indicated in the Contract.
Where no such dimensions are shown the Contractor shall be responsible for sizing the Plant. Any redesign, extra design, additional construction or any other costs resulting from the use of Plant to other arrangements or to other dimensions shall be the responsibility of the Contractor.

5.1.5 Packaging and Protections

All items shall be adequately crated or packaged to withstand damage and prevent deterioration due to shipping, handling and storage.
The methods of protection and shipping shall be to the approval of the Project Manager

5.1.6 Marking

All Plant shall be marked in accordance with Clause 5 of BS EN 545 and Clause 37 of BS 5163. Before shipping, all items shall be clearly marked. Crates or packages shall be marked on two sides with indelible paint with the name of the project, the Employer and the Contract number shall bear marks indicating the contents.

5.1.7 Receipt, Storage, Handling and Transportation

Plant, equipment and materials shall be stored in such a manner as to preserve its quality and condition to the standards required by the Contract. The Project Manager shall refuse to accept or shall reject any materials of Plant that in his opinion is defective or otherwise fails to comply with the standards required by the Contract.

All such defective items shall be removed from the Site as directed by the Project Manager. Repairs shall be carried out in accordance with procedures approved by the Project Manager and shall be completed to the Project Manager's satisfaction.

5.1.8 Manufacturer's Certificates

The Contractor shall furnish the Project Manager with a manufacturer's certificate conforming

compliance to the specification in respect of all items of Plant, equipment and materials. The original and one copy of the manufacturer's certificate shall be delivered to the Project Manager not later than 14 days prior to the intended date of delivery of the item to Site.

5.1.9Proprietary Materials

Proprietary materials shall be supplied in suitable containers and in appropriate batch sizes for the work to be undertaken.
The containers shall be marked with the following information:
Storage instructions
The manufacturer's name
Shelf life and dates of manufacture
Material identification
Batch reference number
Net weight
Mixing instructions

Any warnings or precautions concerning the contents and their safe use.

The Contractor shall supply with each consignment of proprietary material delivered to the Site, certificates furnished by the manufacturer or his agent stating:
The manufacturer's name and address
The agent's name and address where applicable
Material identification (Batch reference numbers, size of each batch and the number of containers in the consignment)
v. Date of manufacture.

5.1.10 Rejected Materials

Should any item of plant, materials or manufactured articles be in the judgment of the Project Manager, unsound or of inferior quality or in any way unsuited for the purpose in which it is proposed to employ them, such items, materials or manufactured articles shall not be used upon the Works but shall be branded, if in the opinion of the Project Manager this is necessary, and shall forthwith be removed from the Site.

5.2 Samples and Storage of Materials

Where required by the Project Manager the Contractor shall submit to the Project Manager for approval samples of pipes, fittings and materials prior to procurement.

The Contractor shall only store pipe, fittings and other material at places approved by the Project Manager and shall at all times provide adequate supervision and watchmen to prevent theft or damage. Any loss or damage incurred will be the Contractor's responsibility.

Pipes shall not be stacked higher than recommended by the manufacturer. The area on which the pipes are to be stacked shall be free draining, the grass or other vegetation shall be kept cut and suitable timber cradles shall be provided on which the pipes shall be laid. End stops to all stacks shall be provided.

Fittings and valves shall not be stacked more than one tier high and they shall be supported off the ground by suitable timbers.

Air valves, rubber joint rings, gaskets, bolts and similar fittings and materials shall be kept in approved locked premises and such fittings and materials shall not be distributed to the trench side until immediately prior to laying, fitting, jointing or assemble thereof.

All rubber joint rings and gaskets must be stored in a cool damp location and all fittings and materials shall at all times be stored in the shade under cover and protected from the weather to the satisfaction of the Project Manager.

5.3 Flanges

Flanges shall be faced and drilled to conform to the dimensions specified in BS 4504. Flanges shall be compatible with the pressure rating of the adjacent pipework or as stated on the drawings. Bolts, nuts and washers (two washers per bolt) shall be to BS EN 1092-3; 2003.

No bolt shall project less than two full threads beyond its nut after tightening. In no circumstances shall the shortening of excessively long bolts by cutting be allowed.

Gaskets shall comply with replaced by BS EN 1514 (1997) and replaced by BS EN 681-2 (200) and BS 681-1 (1996) Type W. Flanges shall be painted with two coats of epoxy resin paint. Puddle flanges shall be fitted to all pipework passing through water-retaining structures and manholes greater than 2.5m deep.

5.4 Mechanical Couplings

Unless otherwise specified or shown in the Drawings pipes and fittings shall be supplied with flexible joints. Mechanical couplings shall be of the Dresser, Viking Johnson type without a centre register. Joints rings used shall be of the ethylene propylene rubber (EPDM) or other material approved by the Project Manager. All mechanical couplings and flange adapters including nuts, bolts and washers shall be supplied with 'Rilsan' nylon thermoplastic polyamide applied by fluidized bed dipping or similar approved.

5.5 Materials for the Assembly of Flexible Joints

Lubricant shall be of a kind not conducive to the growth of bacteria and shall have no deleterious effects on either the joint rings or pipes. Lubricants for water supply shall not impart to water, taste, colour, or any effect known to be injurious to health.

5.6 Ductile Iron Pipes

5.6.1 General

Ductile iron pipes and fittings for water supply shall comply with BS EN 545 (1995). Pipes and fittings shall have spigot and socket joints unless otherwise specified. Pipes shall be class K9. Spigot and socket flexible joints shall be of the push-fit type with gaskets of ethylene propylene rubber (EPDM). The Contractor shall supply 5% of the straight pipes suitable for cutting on site and these shall be clearly marked.

5.6.2 Corrosion Protection

Pipes and fittings shall be protected externally with an extruded polyethylene or polyurethane coating complying with DIN 30674 Part 1. Pipes and fittings shall be lined internally with centrifugally applied cement mortar and complying with DIN 30674. Joint areas shall be coated with epoxy or polyurethane to DIN 30674. All lining and coating materials shall be approved for contact with potable water by an internationally recognized body like the Drinking Water Inspectorate of UK.

5.7 Galvanised Steel Pipes

Galvanised steel pipes shall be medium duty manufactured to BS 1387.

5.8 Steel Pipes

5.8.1General

Steel pipes shall be manufactured to BS EN 10224 or AWWA C200 and shall be suitable for the pressure ratings required by the Contract. Fittings shall conform dimensionally to BS EN 10224, AWWA 208-59 or AWWA M11. Unless otherwise specified or necessary to meet the requirements of the Contract steel pipes shall be manufactured as follows:

DN300mm and below shall be manufactured to minimum of Grade L235 or API 5L Grade B DN350mm and above shall be manufactured to a minimum of Grade L275 or API 5L Grade X42.

The pipes and fittings of diameter 600mm or less shall be supplied with push-fit spigot and socket type joints with integral gasket of EPDM rubber or similar to BS EN 10224 or BS CP 2010. Pipes greater than 600mm shall be supplied with ends cut square suitable for use with flexible couplings and the external weld ground back sufficiently.

The Contractor shall supply 5% of the straight pipes as half length pipes (not exceeding 6m). Each pipe shall be supplied complete with a coupling for jointing.

5.8.2 Corrosion Protection

Steel pipes and fittings shall be protected externally at the manufacturer's works with fusion bonded epoxy resin in accordance with AWWA C213. Pipes greater than 600mm and all fittings shall also be lined internally with fusion bonded epoxy to AWWA C213. Pipes 600mm or less shall be lined with cement mortar to AWWA C205 or BS EN 10298. All lining and coating materials shall be approved for contact with potable water by an internationally recognized body like the Drinking Water Inspectorate of UK.
Where required by the Bills of Quantities, the Supplier shall also price for the provision of an alternative 3LPE coating to DIN 30670 or AWWA C215 of a triple wrap system of fusion bonded or sprayed epoxy primer, an intermediate polymer adhesive layer and an extruded high density polyethylene coating in general conformance with ISO/DIS 21809-1 Class B as appropriate.

5.9 Glass Reinforced Plastic (GRP) Pipes and Fittings

Glass reinforced plastic (GRP) pipes and fittings for sewers shall be high stiffness and shall comply with the relevant provision of BS 5480. The minimum pipe stiffness shall be 5,000 N/m^2.
Pipes and fittings shall be marked in accordance with Clause II g. BS 5480.

Pipes shall only be cut by techniques which can be shown not to impair the pipes pressure regression performance. Where any pipe is cut the exposed fibres at the cut pipe end shall be resealed to prevent potential long-term degradation. Methods of cutting and resealing exposed fibres shall be submitted to the Project Manager for Approval. Elastomeric sealing rings and foils shall comply with BS EN 681.

On delivery to site and immediately prior to installation each pipe shall be visually inspected both externally, and where possible, internally for damage such as star cracking of the gel coat layer. Where any damage extends through the pipe wall the pipe shall be rejected or the damaged section cut out and replaced in accordance with repair methods approved by the Project Manager. If in the Project Manager's opinion, the pipe is not suitable of repair it shall be rejected and removed from site.

5.10 uPVC Sewers and Pressure Pipes and Fittings

Unplasticised PVC pipes and fittings for water supply pressure pipes shall comply with British Standards 3505 current but also superseded by BS EN 1452 and 4346. They shall be obtained from an approved manufacturer and shall be minimum pressure rated (14 bar) unless otherwise stated.
Unplasticised PVC pipes and fittings for gravity sewers and drains shall comply with British Standards 4660 or 5481 and shall be obtained from an approved manufacturer. Restrained rubber ring type push fit flexible joints shall be used unless otherwise stated. Solvent weld joints will not normally be permitted. Pipes and fittings shall be protected from the direct rays of the sun at all times by means of reflective cover sheets.

5.11 Concrete Pipes, Bends and Junctions

Concrete pipes, bends and junctions for use in sewers shall be made with sulphate-resisting cement. Pipes, bends and junctions shall conform to the requirements of BS 5911 for the particular class of pipe required to be used. The internal dimensions shall be true and regular and the internal surface smooth and free from surface blemish. The actual diameter of the pipe shall be not less than the nominal diameter. All joints shall be of the gasket type with flexible spigot and socket approved by the Project Manager. Gaskets shall be elastromeric complying with BS EN 681.

The main pipe and branches of all junctions shall be of the same strength classification and shall have the same internal dimensions as the pipes with which they are to be used.
The pipes, bends and junctions delivered to the Site shall be certified by the pipe manufacturer to have complied with BS 5911, or other approved standard and one copy of the certificate shall be delivered to the Project Manager before the goods are unloaded.
Unless otherwise specified pipes are required to be of Extra Strength; they may, unless otherwise specifically called for, be reinforced either with cast-in steel or by an external wrapping of fibre glass and resin, applied by an approved manufacturer.

The Contractor shall provide all facilities for and shall carry out jointly with the Project Manager (if so required) a full visual inspection of all pipes, bends and junctions for manufacturer's defects and other faults or damage. Before any pipe, bend or junction is laid it shall again be carefully examined and sounded with a wooden mallet. Any pipe found to be cracked or otherwise defective shall not be used on the Works.

Concrete pipes shall be internally coated with a 100 percent solids coal tar epoxy lining 70 percent minimum epoxy content. Coat thickness 300 micron minimum.

5.12 Polyethylene Pipes and Fittings

5.12.1General

Polyethylene pipes up to nominal size 63mm for below ground use shall be coloured blue and comply with the relevant provisions of **BS EN 12201**. Polyethylene pipes for use in nominal diameters greater than 63mm shall be coloured blue High Density Polyethelene (HDPE) suitable for a working pressure of 14 bar.
The pipes shall be clearly and indelibly marked to show the name of the manufacturer, diameter, pressure class and date of manufacture.

House connection pipework downstream of the manifold shall be PE80, all other HDPE pipework shall be PE100.

5.12. 2 Joints

Unless otherwise specified or approved by the Project Manager, Polyethylene pipes shall be butt fusion or electro fusion welded. Joints between polyethylene pipes supplied from different manufactures or not manufactured from the same grade of polymer shall only be joined by electro fusion or by push fit mechanical couplings.

Mechanical couplers and compression type fittings shall incorporate a serrated internal liner to support the pipe against compression loads exerted by the fitting and to prevent pullout under axial load.

Butt or socket fusion joint techniques shall only be applied between pipes supplied from single source and manufactured from the same grade of base polymer. Fusion welding of polyethelyne pipes shall only be undertaken by skilled operatives using appropriate specialized tooling. Pipes to be jointed shall be free from contamination and care shall be used to protect fusion jointing operations from wind and against the effects of inclement weather.

Mechanical jigs or other approved methods shall be used to ensure correct alignment of the pipe when making butt fusion joints. Details of fusion welding procedures including details of tools, operatives, materials and method statements shall be submitted to the Project Manager for approval prior to any jointing.

Steel and iron pipe fittings shall comply with the relevant provision of BS EN 545 (1995) replaced by BS EN 10224 but also current.

5.13 Gate Valves

5.13.1 General

Valves for normal duty on water pipelines with pressure ratings up to PN25 shall be key operated cast iron flanged gate valves for waterworks purposes generally complying with the requirements of BS 5163 (Type B). All Gate Valves shall be supplied with a 10 year manufacturer's warranty.
Cast iron gate valves for pressure ratings to PN14 shall be cast iron flanged valves complying with BS 5150 replaced by BS EN 1171 (both BS 5150 and BS 5151) or cast iron parallel slide valves complying with BS 5151.

Butterfly valves for pressure ratings of up to PN14 shall be double flanged wafer type butterfly valves complying with BS 5155.

Unless otherwise specified valves for use on steel pipes shall be flanged, where butt-weld ends are specified valves shall comply with BS EN 1984, or BS EN 13709.

5.13.2 Wedge Gate Valves for Manual Operation

Valves up to and including DN 300 shall be of the resilient seal type and valves larger than DN 300 shall have metal seals.
Spindles shall be of the non-rising type and screwed so as to close the valves when rotated in the clockwise direction. The direction of closing shall be clearly cast on the valve cap or hand wheel as appropriate. The valves shall be constructed of the following materials:

body - cast iron;

spindle	-	forged bronze or stainless steel;
metal faces and seal	-	Gunmetal.

The valves shall be suitable for the unbalanced head as specified or indicated in the schedules.

Suitable gearing and anti-friction devices such as ball bearing thrust collars shall be provided as necessary to enable opening and closing by manual operation at the pressure stated, using an effort no greater than 26kg on the tee key or hand wheel supplied. Handwheels shall not exceed 500mm diameter. A bypass with gate valve forming an integral part of the valve shall be provided where recommended by the valve manufacturer for the pressures specified.
Gearing on valves of DN 300 and less shall be enclosed in a sealed gearbox suitable for buried installation and operated with a tee key. Except where shown in the Drawings, all valves exceeding DN 300 shall be provided with bevel gearing and handwheels. Valves to be used for washouts and isolating air valves shall have screwed seats.

Extension spindles shall be galvanized or stainless steel adequately supported with cast iron brackets, and of sufficient diameter to prevent any whiplash effect through twisting when being used to operate the valves. The spindles shall be capped for key operation. Valve caps shall be fitted with hexagonal set screws.

Valves shall be coated with an approved epoxy complying with DIN 30674. Keys for valve operation shall be of sufficient length so that the valves can be operated by a man standing, but shall not exceed 1.2m in length, and shall have a detachable cross bar.

5.14 Butterfly Valves

5.14.1General

Butterfly valves shall conform to BS EN 593. All Butterfly Valves shall be supplied with a 10 year manufacturer's warranty.

5.14.2 Construction

Butterfly valves shall have a high grade cast iron body to BS EN 1561 designed to the specified working and test pressures. The pressure rating valve shall be cast in the valve body. The disc shall be of high grade cast iron to BS EN 1561 or nodular cast iron to BS 2789 to the defined working and test pressures. It shall have a convex shape designed to achieve low head loss characteristics. The valve shafts shall be of stainless steel operating in self-lubricating bushes in the body.
The valve seat shall be of gunmetal to BS 1400. The sealing ring shall be a renewable Ethylene Propylene Diene Monomer (EPDM) rubber attached to the disc edge by a sectional bronze retaining ring to form a resilient and durable seal.

The valves shall be fitted with hand wheel actuators not exceeding 500mm diameter incorporating gearing to allow opening and closing by manual operation at the pressure stated using an effort no greater than 36kg on the hand wheel supplied.
In all cases the gearing shall be designed to close the valve, from fully open to fully closed in a period of not less than ten minutes with this effort. Actuators shall be designed so as to close the valves when the hand wheel is turned in a clockwise direction; the direction of closing shall be clearly cast on the hand wheel. Position indicators shall be fitted to all actuators.

Where required valves shall be electrically actuated with a manual override. Remote actuation shall be provided with a visual indication of valve open, valve closed and percentage opening together with fault indication.

5.14.3 Valve Performance

A performance curve, relating percentage valve travel, open area and discharge coefficient shall be submitted to the Project Manager. The head loss coefficient with valve fully open shall be defined.

5.14.4 Testing

All valves shall be tested in accordance with BS EN 593 and pressure and material test certificates shall be submitted to the Project Manager for approval.

5.15 Air Valves

Air valves shall be either:
Single (small) orifice valves (SAV), for the discharge of air during the normal operation of the pipeline.

Double orifice valves (DAV), consisting of a large orifice and a small orifice. These shall permit the bulk discharge of air from the main during filling and air inflow when emptying in addition to the discharge of small quantities of air during normal operating conditions.

Air valves shall be supplied with an independent isolating butterfly valve (DAV) or cock (SAV) which permits the complete removal of the air valve from the main, without affecting the flow of water in the main.
Each air valve assembly shall be suitable for connection to a flange on the pipeline.
At the connection between the air valve and its isolating valve a BSP tapping shall be made suitable for fitting of a pressure gauge. All tappings shall be sealed by a brass plug and copper compression ring gasket.

Air valves shall operate automatically and be constructed so that the operating mechanism will not jam in either the open or closed positions.

5.16 Non-Return Valves

5.16.1 Swing Check Valves

Non-return valves shall be suitable for waterworks purposes and shall be manufactured to comply with the general requirements of BS EN 12334. They shall be double flanged type, non-slamming and recoilless on flow reversal.
Valves of DN 700 and larger shall be of the multi-disc type or tilting disc type. The valves shall have a high- grade cast-iron body and cover to BS EN 1561 Grade 220/260 with gun metal nickel bronze alloy door seating. The hinge pin shall be of stainless steel carried on non-corrodible bearings.

5.16.2 Nozzle Check Valves

Nozzle check valves shall be slam free closing with a streamlined cross section as manufactured by Mannesmann Demag or similar.

5.17 Flow Control Valves

Flow controls unless otherwise specified shall be butterfly valves. They shall be installed complete with a headstock and position indicator showing the degree of opening.

5.18 Pressure Reducing Valves

Pressure reducing valves shall automatically reduce a higher inlet pressure to a steady lower downstream pressure regardless of changing flow rate or varying inlet pressure. The valve shall be a hydraulically operated pilot-controlled diaphragm type, globe or angle valve.

The main valve shall have a single removable seat and a resilient disc.

5.19 Ball Float Valves

Ball float valves which are to be installed within reservoirs shall be the delayed action type to eliminate inflow at small valve openings. They shall be fitted with a stilling chamber, auxiliary float valve and inlet bellmouth with regulating valve. The main valve shall be fitted with a long actuating lever to provide a long float travel for slow valve closure.

Valves shall be of the right angle pattern type with flanged inlet and have a resilient synthetic rubber disc which forms a drop tight seal against a removable seat insert. Valves shall be free of cavitation and vibration under the specified working conditions. Flanged tapers shall be provided on the inlets as necessary to suit the size of valves proposed.

Valves shall be capable of withstanding the maximum static pressure and of passing the maximum flow rate shown. Orifice plates shall be provided as necessary to absorb excess working pressure at the initial flow rates indicated.

The pressure rating of the valve shall be cast into the body of the valve.

5.20 Constant Flow Valves

Constant flow valves shall maintain a constant rate of flow regardless of fluctuations in upstream pressure.

Valves shall be hydraulically operated, diaphragm actuated globe pattern. They shall have a resilient synthetic rubber disc which forms a drop tight seal against a removable seat insert.

The diaphragm assembly and valve stem shall be fully guided at both ends by bearings in the valve cover and valve seat. The diaphragm shall consist of nylon fabric bonded with synthetic rubber. Packing glands and stuffing boxes are not permitted and there shall be no pistons operating the valve or pilot controls.

The pilot control shall be direct acting diaphragm valve designed to close when the actuating differential increases beyond the spring setting. The actuating differential pressure shall be produced by a thin edged orifice plate installed in an orifices flange downstream of the valve.

Any necessary repairs to the valve shall be accomplished without removing the valve from the main.

Valves shall be sized to pass the maximum continuous flow stated on the drawings at the working pressure given. The pressure rating of the valve shall be cast into the body of the valve.

5.21 Surface Boxes and Chamber Covers

Surface boxes and chamber covers shall be either cast iron or ductile iron and coated with black bituminous solution. Surface boxes over gate valves shall be hinged and chained and shall generally comply with BS 5834. In roads, tracks, verges: Heavy duty with 150 x 150mm nominal clear opening.

In fields and areas subjected to light wheeled or pedestrian traffic: Medium duty with 150 x 150 mm nominal clear opening.

Surface boxes for hydrant chambers shall have a 150 x 150mm clear opening and shall comply with BS 750 and shall be suitable for heavy traffic loading.

Covers to air valve and other chambers shall be to the dimensions and loading requirements shown on the Drawings or as stated in the Bill of Quantities.
Covers shall be suitable for the following maximum safe centre static loads:

Light duty	250kg
Medium duty	1500kg
Heavy duty	5000kg

Where applicable, covers shall comply with BS EN 124 or other appropriate Standard.
Lifting keys shall be provided for each type surface box or cover supplies. One set of keys shall be provided for every ten surface boxes or covers subject to a minimum of ten sets of keys or the actual number of covers if less than ten.

5.22 Gully Gratings and Frames

Road gully gratings and frames shall be of approved type and manufacture in cast Grey Ductile Iron and shall be of Heavy Duty Non-rocking Pattern designed for wheel load of 11.5 tonne and generally in accordance with BS EN 124. Single gullies of nominal size 1050mm x 750mm. Inlet gratings of other plan dimensions shall have a minimum water way area of 49% of the total inlet grating area.
Gully frames shall be set in cement mortar and haunched with Class C25 concrete. It shall be the Contractor's responsibility to establish the finished road levels from the appropriate authority and fix the gratings accordingly.

5.23 Manhole Safety Chains

Mild steel chain shall be 8 mm nominal size Grade M (4) non-calibrated chain, Type 1, complying with BS withdrawn. After manufacture, mild steel safety chains shall be hot dip galvanized in accordance with BS EN 124.

5.24 Manhole and Chamber Access Covers

The manhole and chamber access covers shall comply with BS 497 Part 1 and be obtained from an approved manufacturer and shall be to the internal minimum clear opening as detailed in the Contract.
All manhole and chamber access covers in road shall be to an approved Heavy Duty pattern and in footpaths shall be medium/heavy duty unless otherwise specified. The frame and lid shall have key holes formed with sealed pockets underneath to prevent ingress of sand, grit and surface water and shall be of an approved non- rocking pattern. The covers and frames shall have accurate seating faces to prevent rocking and the ingress of sand or water, and it shall be tight fitting to resist overflow conditions or unauthorized removal. The seating faces shall be coated with graphite grease before installation of the cover.

A supply of keys for use with every type of manhole cover and surface box shall be handed over by the Contractor at the completion of the Contract on the basis of one set of keys for each 50 covers or part thereof.

Manhole and chamber cover frames shall be set in cement mortar and haunched with Class C30/10 concrete and shall be set to the camber or fall of the finished road surface. It shall be the Contractor's responsibility to establish the finished road surface levels from the appropriate authority and to fix the covers accordingly.

5.25 Manhole Step Irons

Manhole step irons shall be of galvanized malleable iron and shall conform in all particulars to BS EN 13101.

Section 4B. Pipeline Construction

5.26 General

The requirement of this section shall apply to the construction of potable and raw water pipelines and pipework.

Within this section 'Plant' refers to pipe fittings, valves, surface boxes and chamber covers, and other such materials required for pipelines, mains and pipework at reservoirs and elevated tanks.

All Plant shall be suitable for waterworks purposes for the conveyance of potable water in the climatic conditions prevailing in Kenya and in particular at the location of the Works.

The Project Manager shall provide details of each pipeline diameter, pressure rating, hydraulic characteristics and the approximate alignment. The Contractor shall, in consultation with the Project Manager set out the proposed pipeline alignments, making any changes that the Project Manager may deem necessary, confirming also the exact locations of all manholes, valves, air valves, washouts, hydrants, and the like.

5.27 Topographic Surveys

Topographic surveys along pipeline routes shall be either:
Plan and profile surveys, or
Line and level traverse surveys,
as instructed by the Project Manager.

Plan and profile surveys shall cover a strip of 10.0m wide centrally on the proposed centre line of the pipeline. Line and level surveys shall comprise a traverse line along the centre line of the pipeline as established by the Project Manager.

5.28 Handling and Transport of Pipes and Fittings

The loading, transporting, unloading and handling of pipes and fittings shall be carried out such that no damage is caused. All in accordance with the recommendations of the manufacturer and to the approval of the Project Manager. The use of lifting hooks is not permitted. Pillows shall be provided between lashing (ropes, wires or chains) and the pipes. All cradles and lashings shall be of such widths as to prevent damage to the coating of the pipe, or distortion of the pipes.
Valves and fittings shall be transported in timber packing and where possible in the manufacturer's original packaging.
Protective cover and other protective materials provided by the manufacturer shall not be permanently removed until immediately prior to installation.

In the event of any damage being caused to a pipe, the Project Manager shall determine whether damaged piece shall be replaced or repaired. Repair to coating only shall be allowed and shall be as directed by the Project Manager.

In all instances when along trench sides, ferrous pipes shall be supported within 1 metre of either end on sand filled bags such that no part of the wall of the pipe touches the ground, and in the case of pipes over 6 metres long with additional central sand bags.

When pipes are being loaded into vehicles care shall be taken to avoid their coming into contact with any sharp corners such as cope irons, loose nail heads, etc. Whilst in transit, pipes shall be well secured over their entire length and not allowed to project unsecured over the tailboard of the lorry .Pipes may not be offloaded from Lorries by rolling them, suitable carnage shall be used. Pipes shall not be rolled or dragged along the ground.

5.29 Stringing and Examination of Pipes Prior to Laying

All DI and Steel Pipes and their coatings and linings shall be carefully inspected on Site prior to laying.

Inspection of the pipe will be made by the Project Manager after delivery and again immediately prior to laying. Any pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the site.

All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Project Manager. Handling and laying of pipe and fittings shall be in accordance with the Manufacturer's written instructions and as specified herein.

Before lowering into the trench or placing in position each ductile iron pipe or casting shall be slung and sounded with a mallet to test for hair cracks. Pipes that do not ring true will be discarded.

All cement mortar linings shall be visually inspected for defects such as cracking or spalling and crack widths shall be measured to confirm that width is such that natural re-sealing will occur once put into service; otherwise cracks as well as any spalling shall be made good before laying in accordance with the manufacturer's written instructions.

All epoxy linings and all coatings shall be subjected to holiday detection tests, in accordance with NACE RP 0490, the voltage of the holiday detector being selected appropriate for the material and its thickness. No pipe shall be laid having failed the holiday tests until the defective area is made good in accordance with the manufacturer's written instructions and retested satisfactorily before use.
All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until they are used in the work, and when laid, shall conform to the lines and grades required. Pipe shall not be laid unless the trench is free of water and in a satisfactory condition. Ductile iron pipe and fittings shall be installed in accordance with the requirements of AWWA C600 except as otherwise provided herein. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner by the Contractor, at his own expense.

When laying is not in progress, including any work break exceeding 30 minutes, the open ends of the pipe shall be closed by watertight plugs or other approved means. Good alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by the Manufacturer. End caps shall not be removed until such time as the pipe is to be inspected and laid.

Where the pipeline crosses roads, tracks or any other access or where directed by the Project Manager, the Contractor shall place the pipes so that access to the public is not in any way prohibited.
Shortly before laying or fixing any valve, pipe or fitting, the Contractor shall examine each valve, pipe and fitting to ascertain that there is no damage or defect. The Contractor shall give the Project Manager not less than 48 hours' notice of his intention to undertake such examination. The Contractor shall not lay such pipes and fittings until he has received approval from the Project Manager.
Linings shall be inspected prior to laying and any defect made good.

5.30 Laying Pipes

Immediately before any pipe is lowered into the trench the plug shall be removed from the end of the last pipe laid and the new pipe shall be carefully lowered into the trench.

Each pipe and fitting shall be laid true to alignment curve and gradient in accordance with the Drawings or as directed by the Project Manager. The minimum gradient shall not be flatter than 1 in 500.
Pipes shall be boned to gradient and sight rails shall be provided for this purpose at intervals not exceeding 50m and at all changes in grade. No dips or summits shall be permitted other than as shown on the Drawings.

5.30.1 Embedment and Compaction

All ductile iron and steel pipes shall be embedded using a sand or coarse grained soil with less than 12% fines, which if necessary shall be imported if excavated material is found to be unsuitable:

In areas prone to water logging or where specifically called for on the Drawings or in the Bills of Quantities a single size or graded gravel shall be used as a special lower bedding, with grading as indicated below.

Nominal Pipe Diameter (mm)	Grading for Special Lower Bedding [to ASTM Sieve Sizes]	
	Single size Gravel	Graded gravels
< 200	10 or 14 single-size gravel	14 to 5 graded
200 to 500	10, 14 or 20 single-size gravel	14 to 5 graded or 20 to 5 graded
> 500	10, 14, 20 single-size crushed rock, or gravel	14 to 5 graded or 20 to 5 graded

The suitability of as-dug trench material as an embedment material and where imported, the source shall be approved by the Project Manager. Any delays as a result of not seeking this approval in good time shall be entirely to the Contractor's account

All layers of the embedment shall be thoroughly compacted, and shall not exceed 150 mm and be raised evenly on both sides of the pipe as it is placed. A minimum compaction of 90% MPD shall be achieved at all times, this being confirmed by sampling and testing at intervals on different levels of embedment at intervals of not more than 50 m with testing in accordance with BS 1377 or ISO 22476 using the "sand replacement" method.
Should any results fail to achieve this absolute minimum level, then the pipes, embedment material and layer shall be removed for an equal distance on either side of the failed test, the total distance being equal to the length between adjacent sampling locations, and re-laid appropriately but with compacted layer thickness halved. In addition the distance between sampling and testing shall also be halved until in the opinion of the Project Manager's Representative a sufficient number of consecutive passes allows both individual layer thickness and the distance between sampling and testing to be returned to the previous thickness and spacing.

All backfill soil above the embedment shall be free from clay lumps, boulders and rock fragments greater than 50 mm and as far as practicable, given the nature of the soil, 90 % MPD shall be attained. However, this requirement may be relaxed to 85% MPD by the Project Manager's Representative if he considers the circumstance warrant it.

5.30.2 Pipes Laid in Trench

Pipes and fittings laid in trench shall have at least the minimum cover stated in the Drawings.
Long radius curves in buried pipelines shall be negotiated by deflections taken up in the joints of one or more pipes. The deflection at joints shall not exceed 75% of the manufacturer's maximum specified limits. Designs have been based upon the use of 6m long pipes. If the Contractor provides longer pipes

sufficient short lengths shall be provided to enable the proposed pipe curvature without additional bends or deep excavation.

Pipes shall not be dragged along the trench bottom. Pipes laid in trenches shall be laid and firmly bedded on an even and uniform bed. Where pipes are not laid on a granular bed, the bottom of the trench shall be smooth and free from stones or other projections.
Joint holes shall be excavated below the trench bottom and shall be as small as possible and shall be filled in and compacted after the pipes are laid and before the refilling of the trench is commenced.

5.30.3 Pipe Bedding and Surround

For polyethylene, uPVC and GRP pipelines, Class S bedding shall be used where the cover is equal to or greater than 1.0m. Where there is less than 0.6m cover, Class A concrete surround shall be used. In between the Project Manager shall decide upon the bedding type dependent upon the assessed risk of damage to the pipe.

5.30.4 Pipes Laid Above Ground

Pipelines to be laid above ground shall be constructed of flanged ductile iron pipes with mechanical type expansion joints. Supports shall be provided at a maximum spacing of one pipe length and adjacent to the flanged joints.
The expansion joints shall compensate for a variation of ambient temperature between zero and 40º C on the adjoining pipeline. Anchorages shall be provided immediately uphill of each expansion joint and at each change in vertical and horizontal alignment. The ground/rock surface under the pipeline shall be re-graded as necessary to allow a satisfactory vertical alignment of the pipeline.

The Contractor may propose, as an alternative to the use of mechanical expansion joints, either of the following methods for accommodating thermal expansion:

A zigzag pipeline alignment whereby the thermal movement is accommodated by deflection of the bends.
A rigid form of construction with the thermal movement being constrained within the pipe walls by the use of substantial anchor blocks.
Joints shall be made in compliance with the manufacturer's instructions as approved by the Project Manager. Care shall be taken to ensure the absolute cleanliness of the pipe ends and joint components. Only the recommended approved lubricants shall be used.
Jointing shall only be carried out by experienced personnel under close supervision by the Contractor.

The Contractor shall ensure that no dirty water or other extraneous matter is allowed to enter the pipes during or after laying. In the event of dirty water or extraneous matter entering the pipes the Contractor shall immediately carry out cleaning and disinfection as directed by the Project Manager.

Except when necessary for jointing, the end of the last pipe laid shall be kept plugged to the satisfaction of the Project Manager to prevent the ingress of dust, dirt, rocks and other debris.
The Contractor shall be liable for any damage caused to the Employer's Plant and apparatus or other equipment as a result of foreign matter of any kind not having been cleared out of pipelines before Taking-Over.

Pipe trenches shall not be backfilled until approved by the Project Manager. Once approved trenches shall be backfilled without delay to at least the minimum extent required for pressure testing.

5.31 Cutting Pipes

The edges of the cut pipes shall be clean, true and square. Ductile iron pipes shall only be cut with an approved mechanical pipe cutter in conformity with the pipe manufacturer's recommendations. The use

of oxyacetylene flame cutter will not be permitted. The edges of the cut together with those parts of the pipes from which the coating has been removed shall be given two coats of bituminous paint and the internal lining repaired. When the cut pipe is to be inserted in a "Tyton" type joint it shall be bevelled for 10mm at 30º to pipe the axis.
Asbestos Cement, HDPE, uPVC and GRP pipes shall be cut with an approved mechanical pipe cutter and in conformity with the pipe manufacturer's recommendations. Where the cut end of the pipe is to be incorporated in a joint the pipe shall be turned down to the correct diameter required for forming the joint by and approved mechanical turning machine. The length of turning shall be accurately bevelled by mechanical means to the dimensions specified in the manufacturer's recommendations.

Steel pipes shall be cut by using a mechanical pipe cutter approved by the Project Manager. The use of an oxyacetylene flame cutter will not be permitted. The edges of the cut shall be given two coatings of liquid epoxy compatible with the original coating. The external coating and the internal lining shall be repaired to the approval of the Project Manager. The cut end shall be bevelled as required to suit the form of joint used.

5.32 Proprietary Joints and Couplings

Proprietary joints and couplings shall be assembled in accordance with the manufacturer's instruction as approved by the Project Manager. Where pipes are laid above ground and jointed with bolted couplings the joint shall be protected against vandalism by sheathing with an approved heat-shrink moulding as manufactured by Raychem of Swindon UK or similar approved.

5.33 Flanged Joints

Flanged joints shall be made with two washers per bolt, one under the bolt head and the other under the nut. The tightening of the bolts shall be carried out in the sequence and to the torque recommended by the manufacturer. A torque wrench shall be used.

Buried flange joints shall be protected by painting with an approved bitumen paint and by wrapping using 'Denso' paste, mastic tape and outer wrap, or similar approved materials all in accordance with the manufacturer's instructions as approved by the Project Manager, unless supplied with epoxy coating and galvanized bolts.
Flanged adaptors and mechanical couplings shall have a RILSAN nylon coating applied by the manufacturer.

5.34 Steel Pipelines Welded Joints

If specifically required under the contract pipes shall not be welded. If permitted by the Project Manager for particular conditions the Contractor shall submit to the Project Manager a detailed method statement for constructing the pipeline using welded joints which shall include, but not be limited, to:
Details of the Contractor's skilled labour and supervision staff who have direct experience in the construction of welded steel pipe;
details of the Contractor's plant to be deployed;
details of temporary staging, access and crankneage;
procedure for construction of supports and anchorages, and welding joints;
Quality assurance proposals for testing the integrity of the welds.

These details shall be submitted to the Project Manager for his approval not later than 21 days before the Contractor wishes to commence pipe laying.

All field welds shall be inspected visually with special attention given to the line up and down the root run or stringer beads. Nondestructive testing of the completed weld shall be carried our using radiographic methods with procedures in accordance with BS 2910.

On completion and inspection of joint welding, remedial works shall be carried out on the internal lining and external coating. No more than five pipe joints shall be welded without completion of remedial works to joints.

5.35 Fixing Valves and Penstocks

Valves, penstocks and other fittings shall be securely fixed. Extension spindles and headstocks shall be properly aligned and fixed in a vertical position and valve caps shall be fixed securely using the locking nut.

5.36 Thrust and Anchor Blocks

Concrete thrust and anchor blocks shall be formed at bends, tees and valves in accordance with the details shown on the Drawings or as directed by the Project Manager. Excavation shall be made after pipe laying and the blocks concreted immediately after excavation. The back supports and blocks shall abut in to solid undisturbed ground with all loose material being removed before concreting.
No pressure shall be applied in any section of main until the concrete has achieved adequate strength and at least three day's curing.

Flexible joints shall not normally be cast in. Where the size of the block does not make this possible, additional flexible joint shall be provided no greater than half a pipe diameter beyond each face of the block.

5.37 Concrete Surround to Pipes

Where pipelines pass under streams and rivers or where directed by the Project Manager, the pipeline shall be surrounded with concrete as shown on the Drawings.
Concrete surround shall be "broken" at all pipe joints to retain flexibility in the pipeline. No joints shall be concreted in without the prior approval of the Project Manager.

5.38 Flotation of Pipelines

The Contractor shall ensure that flotation of the pipeline does not occur during construction. Sufficient backfill shall be placed over each pipe after laying and before testing to prevent flotation.

5.39 Pressure Rating

The pressure rating of pipes shall be as indicated on the drawing or Bill of Quantities or if not indicated then selected such that the maximum pressure in the pipeline inclusive of surge pressures shall not exceed the maximum allowable sustained working pressure rating of the pipe;
The surge pressure amplitude (the difference between maximum and minimum surge pressures) shall not exceed one half of the maximum allowable sustained working pressure rating of the pipe.

5.40 Testing of Water Supply Pipelines

All pressure pipelines shall be hydrostatically tested. Site test pressures shall be1.5 times the maximum working pressure or allowance pressure plus 5 bar whichever is the smaller measured at the lowest part of the pipeline,Unless otherwise specified on the drawings.
The Contractor shall give the Project Manager not less than 48 hours' notice of his intention to carry out a pressure test. Testing shall not commence without the Project Manager's approval. Before a length of pipe is tested, each pipe shall be securely anchored. All thrust and anchor blocks shall have been constructed and, the barrel of each pipe shall be backfilled to the extent necessary to prevent flotation or movement of the pipeline and shall be not less than 600mm.
Normally joints shall be left exposed until pressure testing has been satisfactorily completed. Any need to backfill a pipeline before pressure testing shall not relieve the Contractor of his responsibility to excavate to locate and repair any leaks.

Pressure testing shall be carried out as the work proceeds in such lengths as are convenient but not exceeding 500m. The ends of the length of pipeline under test shall be closed by means of securely anchored caps or blank flanges. Pipeline valves shall not be used for this purpose. All washout valves shall be fitted with blank flanges and the valves opened before the commencement of any pressure test. At each air valve location, a special air release arrangement shall be provided to allow manual release of air during filling operations. Pressure testing shall not be carried out with permanent air valves in place.

The pipeline to be tested shall be filled slowly with water in such a manner that all air is expelled. Air vents shall be checked to ensure that no air is trapped at high points.
The pressure in the pipeline shall slowly be raised to the working pressure, the test pump disconnected and the pipeline left charged under pressure with air valves opened for a period of not less than 24 hours to allow air in the pipeline to be expelled and pipe linings and pipe walls of absorbent materials to become saturated. At the end of this period of time air valves shall be closed and the test pump shall be reconnected and the pressure in the pipeline raised to the test pressure and this pressure maintained for a period of 24 hours or such other period as directed by the Project Manager.

Throughout this period the pressure in the pipeline shall not be allowed to fall or rise more than 6m head of water above the test pressure and this shall be accomplished by pumping water into or releasing water from the pipeline as required. The volume of water pumped into or released from the pipelines shall be carefully measured. At the end of the test period the pressure in the pipeline shall be adjusted to the test pressure by pumping water into or releasing water from the pipeline as required.
The apparent leakage from the pipeline shall be ascertained from the net volume of water that has been pumped into the pipeline during the test period. The permissible loss shall not exceed 2 litres per metre nominal bore per kilometer length per m head per 24 hours.
During the pressure test exposed joints shall be inspected and any leakage or seeping joints shall be remedied. All signs of leakage shall be remedied whether total apparent leakage from the pipeline under test is less than the apparent allowable leakage or not. Should any length of pipeline fail to pass the pressure test the Contractor shall at his own expense carry out all work necessary to locate and remedy the faults and to retest the pipeline until it satisfactorily passes the test.

A low pressure air test (not exceeding 0.3 bar) may be used as a preliminary joint tightness test prior to backfilling and hydrostatic testing. The water used for pressure testing shall be provided by the contractor and shall be free from impurities and of such a quality which will not pollute or injure the pipeline. The Contractor shall be responsible for obtaining the water, transporting it and for its safe disposal on completion.

5.41 Cleansing and Sterilizing of Pipelines

After the pipelines have been completed and pressure tested satisfactorily as herein specified the Contractor shall flush out and cleanse the pipelines. Where water is provided by the Employer, the cost of this will be reimbursable under a provisional sum.
Diameters 300 mm and greater: Pipelines shall be cleansed in sections and this shall be carried out by means of passing through polyurethane foam swabs. The swabs shall be to the approval of the Project Manager.

Diameters less than 300 mm: Pipelines shall be cleansed in sections by flushing with potable water, for a period of time to be decided by the Project Manager's Representative.

Cleansing of any section shall be repeated as required by the Project Manager's Representative in the event of the initial or subsequent operation not being to his satisfaction. The cost of such water shall be charged to the Contractor.

The Contractor shall supply all necessary equipment for the cleansing and sterilizing operations, including all swabs and swab detectors which shall be handed over to the Employer on completion of the Works.

Swabs shall be passed through pipelines at speeds of between 0.2 and 0.4 metres per second to obtain. The best cleaning results with the minimum number of passes. Should it be apparent from the debris collected by the swab that damage to the lining has occurred, the Contractor shall be wholly responsible for repairing the lining to the satisfaction of the Project Manager's Representative.

The swabbing operation shall be controlled by an experienced Project Manager to ensure that no undue surges in the pipeline, heavy docking of the pig or pressurising of the pipeline occur causing damage to any of the permanent works. Any damage caused shall be made good by the Contractor to the satisfaction of the Project Manager's Representative.

The Contractor shall make all necessary arrangements for the transportation of water from the point of supply from the Employer to the required location, and make all arrangements for the disposal of the water. All disposal methods and locations shall be to the approval of the Project Manager's Representative.
When the pipelines have been cleansed to the satisfaction of the Project Manager's Representative the Contractor shall introduce at a slow rate of water flow by a portable chlorinator or other approved means of a solution of sterilizing agent in such quantity and of such strengths as will result in the concentration of chlorine throughout the length of the pipelines of not less than 30 parts per million. This sterilizing charge shall be allowed to remain in the pipelines for 24 hours after which time the pipelines shall be thoroughly flushed using the supply water to remove chlorine in excess of that in the supply water.

When this flushing has been satisfactorily completed samples of water will be taken by the Project Manager's Representative for bacteriological analysis by the Employer. If any of the results of the analyses are unsatisfactory when compared with those of the control sample of the supply water the sterilizing process shall be repeated until satisfactory results are obtained. On completion of sterilizing and flushing the pipelines shall be left full of supply water.

The Contractor shall be solely responsible for the provision of all labour, materials and chemicals necessary for carrying out the foregoing operations.
The cost of water used for repeated cleansing, sterilizing and flushing pipelines in accordance
of the Specification will be charged to the Contractor and the Contractor shall be responsible for all temporary works and other arrangements in connection with cleansing, sterilizing and flushing the pipelines.
The costs of the initial sampling analyses and preparing reports on the bacteriological quality of the water shall be borne by the Employer but the costs of any subsequent sampling analyses and preparing reports should the initial reports be unsatisfactory shall be borne by the Contractor.

5.42 Painting

All steel or ductile iron pipes and fittings exposed to view including above ground pipelines shall be painted after making good the external protection with two coats of “Bitumastic Aluminium solution D. 5909” manufactured by Wailes Dove Bitumastic Ltd, Hebburn, Durham, England, or similar approved.

Pipes and fittings in chambers shall be painted with two coats of “Bituros Solution” manufactured by Wailes Dove Bitumastic Ltd, or similar approved. Valves and Surface Boxes shall be similarly painted.

5.43 Connections to and Diversions to Existing Pipework

5.43.1General

The Contractor shall be responsible for connecting new pipework and service connections laid under the

Contract to existing pipework, and for blanking-off existing pipework and service connections. The connection shall be made in a manner to minimize any disruption to supply.
Before blanking-off or making a connection to existing pipework the Contractor shall notify the Project Manager in writing no less than 14 days in advance of the date on which he proposes to carry out the work. After giving such notice the Contractor shall obtain from the responsible Authority agreement on the precise date, times and method that the connection will be made. The connection or blanking-off shall be made at such times of the day or night as stipulated by the Project Manager.

The Contractor shall prepare a detailed method statement, programme of the work and a schedule of all plant and materials to be used and shall obtain the approval of the Project Manager not less than 72 hours before commencement of the work. The programme shall allow for the immediate re-commissioning on completion of the work.
The Contactor shall be responsible for locating the exact line and level of the existing pipework and service connections and shall agree with the Project Manager and the responsible Authority the precise location of the connection or blanking-off.

5.43.2 Materials

Before commencing the connection, the Contractor shall excavate trial pits as necessary and shall check the outside diameter of the existing pipework and ensure that the couplings to be used for making connections to the existing pipework and the materials used for blanking-off existing pipework are dimensionally suitable.

The Contractor shall ensure that all the materials are on site not less than 24 hours before the commencement of the work.

5.43.3Personnel

The Contractor shall ensure that at least one senior member of his field supervisory staff, who is experienced in such operations and fluent in both English and the language of his labourers is on site throughout the duration of the work.
The Contractor shall also ensure that all necessary skilled artisans and an adequate number of labourers for the operation are on site throughout the work.

5.43.4 Preliminary Work

The Contractor shall execute all works possible before disconnection of the supply including: - Excavation and supports to the excavation.
Blinding with concrete the immediate working areas, but not less than the whole of the bottom of the excavation. Putting in all drains, or where this is not possible a sump of adequate size from which a pump may operate.
Casting the floor of any chamber which is later to be constructed around any of the works. Casting the thrust blocks or any other works which may be required.
Exposing and cleaning pipes in readiness for the work.

5.43.5Carrying out the Work

The Contractor shall be responsible for emptying the section of existing pipework on which the work is to be carried out, by a method agreed with the Authority and approved by the Project Manager.
The Contractor shall take all precautions necessary to prevent dirt and other foreign matter entering the pipelines.

The Contractor shall provide at the Site a sufficient quantity of clean water containing approximately 10 parts per million (10mg/l) of chlorine before proceeding with the cutting of the existing pipeline. Each item of pipework including the joints shall be submerged in the solution for a minimum period of 15

minutes immediately prior to installation.

5.43.6 Water Pipes and Chambers to be abandoned

Where existing water pipes are to be replaced with new pipework the existing pipework is to be abandoned. Where new works conflict with existing pipework to be abandoned, abandonment of pipework shall consist of removal and disposal to a site approved by the Project Manager. Water supply pipework shall not be abandoned until suitable alternative means of supply are in place and ready for connection.

Where chambers are to be abandoned these shall be broken down and disposed of and the void filled and compacted with suitable material approved by the Project Manager. Chambers deeper than 1 metre will be broken down to 1 metre below finished ground level and the remaining void filled and compacted with suitable material approved by the Project Manager.

6.0 SAFETY, HEALTH AND ENVIRONMENT

6.1 Introduction

The prevention of injury and/or illness to the site personnel and the public, damage to the Works and to public and private property, protection of the environment, and compliance with applicable laws, are primary objectives of the Employer. Because of the importance the Employer places on meeting these objectives, selected minimum requirements are outlined in these Safety, Health and Environmental Specifications with which Contractors shall comply while working on this contract.

Given that these Specifications cannot cover every eventuality, the Contractor shall be expected to exercise good judgment in all such matters, even though not mentioned in these Specifications, and shall take any and all additional measures, as required or necessary, to meet his responsibility for safety, health and environmental matters during the period of the Contract.

The Employer nor its representatives shall not be held liable for any actions taken by the Contractor that are attributed to following the minimum requirements stated hereinafter.

The Contractor shall throughout the execution and completion of the Works and the remedying of any defects therein:

Have full regard for the safety of all persons on the Site and keep the Site and the Works in an orderly

state appropriate to the avoidance of danger to any person;

Know and understand all laws governing his activities along with any site requirements and work site hazards. Such information shall be communicated by the Contractor to his personnel and subcontractors;
Take all necessary measures to protect his personnel, the Employer's personnel, other persons, the general public and the environment;

Avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequent of carrying out the Works.

6.2 Compliance with Specifications

The Contractor shall comply with the requirements of these Safety, Health and Environmental Specifications and all other applicable regulations or requirements under Kenyan laws, laid down by relevant authorities or issued by the Employer or the Project Manager concerning safety, health and the environment, in force or introduced or issued from time to time during the period of the Contract.
In so far as these Specifications are applicable, they shall apply to sites and personnel outside the Site associated with the performance of the Contract.
The Specifications equally apply to subcontractors and all other parties engaged by the Contractor and their personnel. The Contractor shall ensure all such parties are fully aware of and comply with the Specifications.
The Contractor shall comply with all notifications and written or verbal instruction regarding safety issued pursuant to these Specifications by the Employer, Project Manager or relevant authorities within the time specified in the notification or instruction.

The Contractor shall adopt a positive approach, awareness and responsibility towards safety, health and the environment, and take appropriate action, by:
Ensuring the Specifications are enforced and followed by the Contractor's personnel. Any failure by the Contractor's personnel to follow the Specifications shall be regarded as a failure by the Contractor.

Paying attention to possible injury to unauthorized persons entering the site, particularly children.

Whenever in these Specifications the Contractor is required to provide test certificates for equipment and personnel and to comply with the relevant authorities' requirements and no independent test facilities are

Available or no relevant authorities exist in Kenya, the Contractor shall provide: in lieu of independent test certificates:
For equipment – details of the tests that have been carried out by the Contractor and a written statement that the Contractor has satisfied himself that the item of equipment is fit and safe for use;
For personnel – details of the training and experience of the personnel and a written statement that the Contractor has satisfied himself that they have the required level of competency;

In lieu of relevant authorities' requirements – details of the Contractor's own rules, regulations, requirements and procedures regarding safety, health and the environment.

If the Project Manager is dissatisfied with the details provided by the Contractor, the Contractor shall provide further details or carry out further tests or provide further written statements as may be reasonably required by the Project Manager.

When the Project Manager has satisfied himself regarding the Contractor's own rules, regulations,

requirements and procedures provided in accordance with (b) above, such rules, etc. shall be deemed to form part of these Specifications and to which Clause 3 shall equally apply.

6.3 Failure to Comply with Specifications

6.3.1 General

Should the Contractor fail to comply with any of the Specifications or requirements of the Project Manager: the Project Manager may suspend the Works of part of the Works until the Contractor has taken the necessary steps, to the satisfaction of the Project Manager, to comply with the Specifications or requirements.

The Employer may, following written notice to the Contractor, carry out themselves or arrange for another contractor to carry out such measures as they may consider appropriate on behalf of the Contractor. Any such actions by the Employer shall not affect or diminish the Contractor's obligations or responsibilities under the Contract.

The Project Manager may, by written notice of suspension to the Contractor, suspend all payment to the Contractor under the Contract if the Contractor fails to rectify any breach of the Specifications within the period specified by the Project Manager, provided that such notice of suspension:
Shall specify the nature of the failure or failures; and
Shall request the Contractor to remedy each such failure within a specified period after receipt by the Contractor of such notice of suspension.

Such suspension of payment shall remain in force until such time as the Contractor has rectified the breach or breaches to the satisfaction of the Project Manager. No interest shall be paid on the suspended payments.
Failure to comply with the Specifications or requirements shall be considered a breach of the Contract by the Contractor and may result in termination of the Contract by the Employer. In the event of the Employer taking action based on this Clause, the Contractor shall not be entitled to any additional costs or extension to the Contract Completion Date. All costs incurred by the Employer pursuant to Sub-Clause 7.3.1.1 (b) shall be deducted from the amounts otherwise due to the Contractor.

6.4 General Requirements

6.4.1Preamble

All references to safety shall be deemed to include health and the environment.

6.4.2 Safety Officer

The Contractor shall appoint a competent Safety Officer who shall be responsible for safety, health and the environment. The Safety Officer shall be given sufficient time by the Contractor to carry out his duties; minimum requirements shall be as follows:

Workforce on site of over 250	-	full time Safety Officer;
Workforce on Site of 100 – 250	-	50% of Safety Officer's time;
Workforce on site below 100	-	as required for the Works but a minimum of 5 hours per week of Safety Officer's time where more than 20 workers.

The Contractor shall provide the Safety Officer with appropriate identification, including a white hard hat with Red Cross symbol and an identification badge. The appointment of the Safety Officer shall be in writing and copied to the Project Manager. The appointment shall include specific instructions to enforce these Specifications and delegated authority to take any action, measure or to issue instruction regarding their enforcement. All persons on Site shall be made aware of the name and authority of the

Safety Officer and instructed to comply with any instruction or direction in safety matters, verbal or in writing issued by the Safety Officer.

The Safety Officer shall be provided with a mobile phone or other similar means of communication. The Safety Officer shall be accessible and available at all times including normal working hours.

6.4.3 Safety Training

The Contractor shall provide safety induction training for all site personnel upon starting on site. The Contractor shall provide safety refresher/reinforcement training at regular intervals for his staff.

6.4.4Safety Meetings

The Contractor shall hold regular safety meetings to provide safety instructions and receive feedback from site personnel on safety, health and environmental matters.

A weekly safety Meeting shall be chaired by the Safety Officer and minutes shall be taken of the meeting. The meeting/minutes shall be given to the Project Manager. The Safety Officer should attend the Contractor's weekly site meetings and "Safety" shall be an item on the agenda.

6.4.5 Safety Inspections

The Safety Officer shall make regular safety inspection of the work site. The Safety Officer shall prepare a report of each inspection.

This report shall include details of all breaches of these Specifications and any other matters or situations relating to safety found during the inspection, instructions issued by the Safety Offices and actions taken by the Contractor. A copy of the Safety Officer's reports shall be given to the Project Manager.

6.4.6 Control of Substances Hazardous to Health

Hazardous materials shall be stored in approved safety containers and handled in a manner specified by the manufacturers and/or prescribed by relevant authorities.

Only properly trained and equipped personnel shall handle hazardous materials.

6.4.7 Potential Hazards

The Contractor shall inform employees of potential hazards, take the appropriate steps to reduce hazards and be prepared for emergency situations. The Contractor shall make an assessment of every operation involving hazardous substances.

The assessment shall be recorded on a Hazardous and Flammable Substances Assessment Method Statement which shall be submitted to the Project Manager prior to the delivery and use of the substance on Site.

6.4.8 Accident Reporting

The Contractor shall report all accidents and dangerous occurrences to the Project Manager. The Contractor shall prepare a report on each accident or dangerous occurrence and a copy of the report, together with witness statements and any other relevant information, shall be submitted to the Project Manager.

A reportable accident or dangerous occurrence shall include any accident to any person on site requiring medical attention or resulting in the loss of working hours or any incident that resulted, or could have resulted, in injury, damage or a danger to the Works, persons, property or the environment.

In the event of an accident or dangerous occurrence, the Contractor shall be responsible for completing all statutory notifications and reports. Copies of all statutory notifications and reports shall be passed to the Project Manager.

All accidents and dangerous occurrences shall be recorded in a Site Accident Book. The Site Accident Book shall be available at all times for inspection by the Project Manager.

The Contractor shall immediately rectify any situation or condition that could result in injury, damage or a danger to the Works, person, property or the environment. If the situation or condition cannot be corrected immediately, the Contractor shall provide temporary barriers and appropriate warning signs and devices and/or take other appropriate action necessary for the protection of persons, property and the environment.

6.4.9Notices, Signs, Etc.

All safety, health, environmental and other notices and signs shall be clearly displayed and written in English. All requirements, instructions, procedures, etc. issued by the Contractor concerning these Specifications shall be printed in English and displayed and readily available to the Contractor's personnel.

6.4.10 First Aid and Medical Attention

The Contractor shall have comprehensive First Aid Kit(s) on Site at all times. First Aid Kits shall be conveniently located and clearly identifiable.

The Contractor shall have one employee on site trained in first aid for every 25 employees. Such persons shall be provided with appropriate identification, including a red hard hat with a white "red cross" symbol; and an identification badge.

The Contractor shall make contingency arrangements for calling a Doctor and transporting injured persons to hospital. The telephone numbers of the emergency services and the name, address and telephone number of the Doctor and nearest hospital shall be prominently displayed in the Contractor's site office.

6.4.11 Employee Qualification and Conduct

The Contractor shall employ only persons who are fit, qualified and skilled in the work to be performed. All persons shall be above the minimum working age. Contractor's personnel shall use the toilet facilities provided by the Contractor.
The Contractor shall ensure:

That no firearms, weapons, controlled or illegal substances or alcoholic beverages are brought onto the Site and that no personnel under the influence of alcohol or drugs are permitted on Site.
That all personnel obey warning signs, product or process labels and posted instructions.

That drivers or operators of vehicles, machinery, plant and equipment follow the rules for safe operations. Drivers shall wear seat belts and obey all signs and posted speed limits.

6.5 Safety Requirements

6.5.1Personal Protective Equipment

The Contractor shall provide personal protective equipment, including hard hats, safety glasses, respirators, gloves, safety shoes, and such other equipment as required, and shall take all measures or actions for the protection and safety of Contractor's personnel.

Non-metallic hard hats shall be worn at all times by all personnel at the worksite with the exception of those areas where the Project Manager has indicated it is not necessary to do so. Safety glasses shall meet international standards and be available for use and worn in specified worksite areas. As a minimum, safety glasses shall be worn for the following types of work: hammering, chipping, welding, grinding,

use of electrically powered or pneumatic equipment, insulation handling, spray painting, working with solvents, and other jobs where the potential of an eye injury exists. Face shields and/or goggles shall be worn where possible exposure to hazardous chemicals, cryogenic fluids, acids, caustics or dust exists and where safety glasses may not provide adequate protection.
When handling acids, caustics and chemicals with corrosive or toxic properties, suitable protection, such as acid suits or chemical resistant aprons and gloves, shall be worn to prevent accidental contact with the substance.

Personnel shall not be permitted to work whilst wearing personal clothing or footwear likely to be hazardous to themselves or others.

The wearing of safety shoes with steel reinforced toes is recommended for all Contractor's personnel on site. In all cases, Contractor's personnel shall wear substantial work shoes that are commensurate with hazards of the work and the work site area.
Hearing protection, including muffs, plugs or a combination thereof, shall be provided for all personnel operating in areas where the noise level exceeds 90 decibels. Such protections shall also be provided for operators working with equipment exceeding such a level. This may include equipment such as excavators, shovels, jackhammers, saws, drills, grinders and the like are being used.

The Contactor shall encourage employees to wear substantial work gloves whenever practical and safe to do so.

6.5.2 Fire Protection and Prevention

The Contractor shall comply with fire protection instructions given by the Authorities having jurisdiction in regard to fire protection regulations. The Contractor shall, upon moving on site, provide to the Project Manager and the Authorities a fire prevention and evacuation plan. This shall include drawing(s) showing the fire assembly points. The fire prevention and evacuation plan and drawing(s) shall be updated from time to time as the Works progress. The Contractor shall ensure all personnel are fully informed on escape routes and assembly points and any changes thereto. Fuel storage will not be permitted in construction work areas. Contractors may establish fuel storage tanks in specified areas set aside for the purpose and approved by the Project Manager. Storage tanks shall be adequately bunded to control spillage. Fire extinguishers shall be provided and installed in a suitable nearby location.

Highly combustible or volatile materials shall be stored separately from other materials and as prescribed by relevant authorities and under no circumstances within buildings or structures forming part of the permanent Works. All such materials shall be protected and not exposed to open flame of other situations which could result in a fire risk.

No combustible material shall be located inside or within 10 metres of a building if structure forming part of the permanent Works. Where units have to be used in these circumstances, they shall be constructed of non- combustible materials and have a half-hour fire rating inside to outside and outside to inside. Non-combustible furniture shall be used where practical.
All temporary accommodation and stores shall be provided with smoke detectors and fire alarms. Smoking shall be banned in high risk areas.
Expanded polystyrene with or without flame retarding additive, polythene, cardboard and hardwood shall not
be used as protection materials. Plywood and chipboard shall only be used as protection on floors. Vertical protection shall be non-combustible. Debris netting and weather protection sheeting shall be fire retardant.

When using cutting or welding torches or other equipment with an open flame, the Contractor shall

provide a fire extinguisher close by at all times. All flammable materials shall be cleared from areas of hot works or work locations prior to welding or oxy/gas burning operations. All hot works shall cease half and hour before the end of a work shift to allow for thorough checking for smouldering materials. Where appropriate, areas of hot works are to be soused in water before the shift ends.

An adequate number of fire extinguishers of types suited to the fire risk and the material exposed shall be provided. These shall be placed in accessible, well-marked locations throughout the job site. Contractor's personnel shall be trained in their use. Extinguishers shall be checked monthly for service condition and replaced or recharged, as appropriate after use.

Only approved containers shall be used for storage, transport and dispensing of flammable substances. Portable containers used for transporting or transferring gasoline or other flammable liquids shall be approved safety cans. Fuel burning engines shall be shut off while being refuelled. Adequate ventilation to prevent an accumulation of flammable vapours shall be provided where solvents or volatile cleaning agents are used.

Flammables shall not be stored under overhead pipelines, cable trays, electrical wires or stairways used for emergency egress. Paints shall be stored and mixed in a room assigned for the purpose. This room shall be kept under lock and key.
Oily waste, rags and other such combustible materials shall be stored in proper metal containers with self- closing lids and removed every night to a safe area or off site. Every precaution shall be taken to prevent spontaneous combustion.

6.5.3 Electrical Safety

All temporary electrical installations, tools and equipment shall comply with current regulations dealing with on-site electrical installations. The Contractor shall establish a permit-to-work system for work in or in proximity to energized circuits of any voltage. Contractor's personnel shall not commence work on such circuits unless a permit to work has been issued and adequate safety measures have been taken and the work operation has been reviewed and approved by the Project Manager.
Only authorized personnel shall be allowed to work or repair electrical installations and equipment. Portable tools and equipment shall be 240 volt, unless otherwise agreed by the Project Manager.

When portable or semi-portable equipment operates at voltages in excess of 240 volts, the supply shall be protected by a Residual Current Device (RCD) regardless of any such device fitted to the equipment. The RCD must have a tripping characteristic of 30 milliamps at 30 milliseconds maximum.
All static, electrically powered equipment, including motors, transformers, generators, welders and other machinery, shall be properly earthed, insulated, and/or protected by a ground fault interruption device. In addition, the skin metal buildings and trailers with electric service shall be earthed. Metal steps, when used shall be securely fixed to the trailer.
Lampholders on festoon lighting shall be moulded to flexible cable and be of the screw in type. Clip on guards shall be fitted to each lamp unit.

All tungsten-halogen lamps shall be fitted with a glass guard to the element. These lamps must be permanently fixed at high level.

Electrical equipment shall be periodically inspected and repaired as necessary by competent persons.

Any work in electrical equipment and systems shall be made safe through locking, tagging, and/or isolation of the equipment before work commences. Prior to the start of the work, the equipment or systems shall be tested to ensure that they have been properly de-energised and isolated.

Electrical repair work on energized systems shall be avoided whenever possible.
Electrical trouble shooting shall be conducted only after getting written approval of the Project Manager.

Unauthorized personnel shall not enter enclosures or area containing high voltage equipment such as switchgear, transformers or substations.

6.5.4 Oxygen/Acetylene/Fuel Gases/Cartridge Tools

Compressed oxygen shall never be used in the place of compressed air. Flash-back (Spar) arrestors shall be fitted to all gas equipment. Liquid petroleum Gas (LPG) cylinders shall not be stored or left in areas below ground level overnight. Cylinders must be stored upright.
The quantity of oxygen, acetylene and LPG cylinders at the point of work shall be restricted to a maximum of one day's supply. Cylinders shall be kept in upright vertical rack containers or be safely secured to a vertical support.

Cartridge tools shall be of the low velocity type. Operators must have received adequate training in the safe use and operation of the tool to be used.

6.5.5 Scaffolding/Temporary Works

No aluminium tube shall be used, except for proprietary mobile towers, unless otherwise agreed with the Project Manager.

Drawings and calculations shall be submitted to the Project Manager, prior to commencement of work on the site, for all Temporary Works, including excavations, falsework, tower cranes, hoists, services and scaffolding. Designs shall conform to international standards.

The Project Manager will not approve Temporary Work designs but the Contractor shall take account of any comments on such designs made by the Project Manager.

The Contractor shall inspect and approve all Temporary Works after erection and before access, loading or use is allowed. Completed and approved Temporary Works shall be tagged with a scaff-tag or similar safety system and the Safe Structure insert displayed. For scaffolding, one tag shall be displayed every 32 m2 of face area. A central record system shall be kept on all Temporary Work. Temporary Works shall be inspected weekly and similarly recorded.

All mobile scaffold towers shall be erected in accordance with the manufacturer's instructions and a copy of these shall be submitted to the Project Manager prior to any use on site. Additionally, all towers shall be erected complete with access ladder, safety rails and kick boards whatever the height.

The Contractor shall repair or replace, immediately, any scaffold, including accessories, damaged or weakened from any cause.
The Contractor shall ensure that any slippery conditions on scaffolds are eliminated as soon as possible after they occur.
All scaffolds used for storing materials, for brick or block laying, for access to formwork or for any other purpose where materials may be accidentally fall, shall be provided with wire mesh guards of a substantial material, in addition to kick boards.

6.5.6 Use of Ladders

Manufactured ladders shall meet the applicable safety codes for wood or metal ladders. Metal ladders shall not be used where there is any likelihood of contact with electric cables and equipment. All metal ladders shall be clearly marked: "Caution – Do not use around electrical equipment". Job made ladders shall not be permitted.

Extension or straight ladders shall be equipped with non-skid safety feet, and shall be no more than 12 m in height. The maximum height of a step ladder shall be 2 m. Ladders shall not be used as platforms or scaffold planks.

Ladders rungs and steps shall be kept clean and free of grease and oil.

Extension and straight ladders shall be tied off at the top and/or bottom when in use. Only one person shall be allowed in a ladder at a time.

Defective ladder shall be taken out of service and not used. Ladders shall not be painted and shall be inspected for defects prior to use.

6.5.7 Elevated Work

The Contractor shall provide all personnel, while working at an elevated position, with adequate protection from falls. Details of such protections shall be submitted to the Project Manager.

The Contractor shall carry out daily inspections of all elevated work platforms. Defects shall be corrected prior to use.

6.5.8 Roofing and Sheet Metal Laying

A Method Statement detailing the procedures to be adopted shall be submitted to and agreed with the Project Manager prior to commencement of work on the site.
Mobile elevating work platforms or the equivalent shall be used to install roofing and sheet materials wherever practicable and a suitable base is available.

Erection of Structures

A Method Statement detailing the procedures to be adopted shall be submitted to and agreed with the Project Manager prior to commencement of work on the site.

Safety harness and lines shall be provided by the Contractor for use by the erection personnel and worn at all times.

Mobile elevating work platforms or the equivalent shall be used to erect structures wherever practicable and a suitable base is available.

Mobile Elevating Work Platforms

Operators shall be trained in the safe use of such platforms and hold a current Certificate of Competence.

Hoists

A copy of the current Test Certificate shall be submitted to the Project Manager before any hoist (personnel or material) is brought into operation on the site.
Where the range of travel is increased or reduced a copy of the revised Test Certificate shall be submitted.

Each landing gate shall be fitted with a mechanical or electrical interlock to prevent movement of the hoist when any such gates is in the open position.

Safety harness must be worn and used by personnel erecting, altering and dismantling hoists.

Suspended Cradles

Suspended cradles shall be installed, moved and dismantled by a specialist contractor. Suspended cradles shall comply with local regulations.

All powered suspended cradles shall incorporate independent safety lines to overspeed braking devices and independent suspension lines for personal safety harness attachment.

6.5.8 Use of Temporary Equipment

The safe design of any piece of equipment shall not be exceeded, nor shall the equipment be modified in any manner that alters the original factor of safety or capacity. Mobile equipment shall be fitted with suitable alarm and motion sensing devices, including back-up alarm, when required. The Contractor shall ensure that the installation and use of equipment are in accordance with the safety rules and recommendations laid down by the manufacturer, taking into account the other installations already in place or to be installed in the future.
The contractor shall inspect Equipment prior to its use on the Works and periodically thereafter to ensure it is in safe working order. Special attention shall be given to such items as cables, hoses, guards, booms, blocks, hooks and safety devices. Equipment found to be defective shall not be used and immediately removed from services, and a warning tag attached.

Natural and synthetic fibre rope made of material such as manila, nylon, polyester, or polypropylene shall not be used as slings. Only trained, qualified and authorized personnel shall operate equipment. All drivers and operators shall hold a current Certificate of Training Achievement for the equipment being used. A safety observer shall be assigned to watch movements of heavy mobile equipment where hazards may exist to other personnel from the movement if such equipment, or where equipment could hit overhead lines or structures. The observer shall also ensure that people are kept clear of mobile equipment and suspended tools.

When mobile or heavy equipment is travelling onto a public thoroughfare or roadway, a flagman shall ensure that traffic has been stopped prior to such equipment proceeding. While the mobile or heavy equipment is travelling on a public roadway, a trailing escort vehicle with a sign warning of a slow-moving vehicle that is dangerous to pass shall be provided.

6.5.9 Cranes:

The Contractor shall give a minimum of 48 hours' notice to the Project Manager prior to bringing a crane on site.
No cranes shall be erected in the site without the prior approval of the Project Manager. The Project Manager may direct the Contractor as to location where cranes may not be located. The Contractor shall take such directions into account when submitting his proposals for crane location points, base footings, pick up points and swing radius. Compliance with any such direction shall not entitle the Contractor to any extension of the Period of Completion or to any increase of the Contract Price.
Safety harness shall be worn and used at all times by personnel engaged on the erection, alterations and dismantling of tower cranes.

The Contractor shall provide a copy of the current Test Certificate (see Sub-Clause 702.5) to the Project Manager before any crane (tower or mobile) is brought into operation on the Site.

All lifting tackle must hold a current Test Certificate. All lifting tackle must be thoroughly examined every 6 months and an inspection report raised.
All fibrous/web slings shall be destroyed and replaced 6 months after first use.

All crane drivers/operators shall hold a Certificate of Training Achievement for the class of crane operated. All banksman/slingers shall hold a Training Certificate from a recognized training agency.
The maximum weekly working hours of a crane driver or banksman shall be restricted to 60 hours.

Under no circumstances shall a crane or load come within 4 m of any energized overhead power line or other critical structure.

6.5.10 Locking-out, Isolating and Tagging Equipment.

Equipment that could present a hazard to personnel if accidentally activated during the performance of installation, repair, alteration, cleaning, or inspection work shall be made inoperable and free of stored energy and/or material prior to the start of work. Such equipment shall include circuit breakers, compressors, conveyors, elevators, machine tools, pipelines, pumps, valves, and similar equipment.

Where equipment is subject to unexpected external physical movement such as rotating, turning, dropping, falling, rolling, sliding, etc., mechanical and/or structural constraints shall be applied to prevent such movement. Equipment which has been locked-out, immobilized, or taken out of services for repair or because of a potentially hazardous condition shall be appropriately tagged indicting the reason it has been isolated and/or taken out of service. Where safety locks are used for locking out or isolating equipment, the lock shall be specially identified and easily recognized as a safety lock.

6.5.11 Installation of Temporary or Permanent Equipment

During installation and testing the Contractor's specialists Project Manager shall be in attendance. All control mechanism panel and wiring diagrams shall be available and printed in English.

6.5.12 Laser Survey Instruments

Details of the types and use of laser instruments shall be submitted and agreed with the Project Manager.

6.5.13 Working in Confined Spaces

Confined spaces, including tanks, vessels, containers, pits, bins, vaults, tunnels, shafts, trenches, ventilations ducts, or other enclosures where known or potential hazards may exist, shall not be entered without prior inspection by and authorization from the Site Safety Officer and the issuance of a Hazardous Work Permit.

Prior to entering the confined space, the area shall be completely isolated to prevent the entry of any hazardous substances or materials which could cause an oxygen deficient atmosphere. All equipment that could become energized or mobilized shall be physically restrained and tagged. All lines going into the confined space shall be isolated and/or blanked.

Personnel working in a confined space where emergency escape or rescue could be difficult, shall wear a safety harness attached to a lifeline. A qualified attendant(s), trained and knowledgeable in job-relater emergency procedures, shall be present at all times while persons are working within the confined space. The attendant shall be capable of effecting a rescue, have necessary rescue equipment immediately available, and be equipped with at least the same protective equipments as the person making entry.

All equipment to be used in a confined space shall be inspected to determine its acceptability for use. Where a hazard from electricity may exist, equipment utilized shall be of law voltage type. The atmosphere within the confined space shall be tested to determine if it is safe to enter. Acceptable limits are:

Oxygen: 19.5% lower, 22% higher;

Flammable gas: not to exceed 10% of lower explosion limit; toxic contaminants: not to exceed the permissible exposure limit.

Subsequent testing shall be done after each interruption and before re-entering the confined space, as well as at intervals not exceeding 4 hours. Continuous monitoring is preferable and may be necessary in certain situations.

Adequate ventilation shall be provided to ensure the atmosphere is maintained within acceptable limits.

6.5.14 Demolition

A detailed Method Statement detailing the demolition procedures/techniques to be used shall be submitted to and approved by the Project Manager prior to commencement of work on site.

The Method Statement must include full details of measures to be taken to ensure that there are no persons remaining in the building/structure and to distance members of the public and Contractor's personnel from the building/structure prior to demolition.

6.5.15 Use of Explosives

The Contractor shall not use explosives without the written permission from the Project Manager and relevant authorities.

The Contractor shall observe all regulations regarding proper purchasing, transportation, storage, handling and use of explosives. The Contractor shall ensure that explosives and detonators are stored in separate special building. These secured buildings shall be constructed, located and clearly marked in English:
"DANGER – EXPLOSIVES"
All as approved by the Project Manager and relevant authorities. The Contractor shall ensure that all possible precautions are taken against accidental fire or explosion, and ensure that explosives and detonators are kept in a proper and safe condition. The contractor shall ensure that explosives and detonators are always transported in separate vehicles and kept apart until the last possible moment and that metallic tools are not used to open boxes of explosives or detonators.

Blasting Procedure: the contractor shall carry out blasting operations in a manner that will not endanger the safety of persons or property. The Contractor shall, along with other necessary precautions:
Clear all persons from building and the area affected by the blasting. All such persons shall be given adequate notice of the actual time and date of blasting; ensure that police and other local authorities are kept fully informed, in advance, of the blasting programme so that they may be present when blasting takes place if they so require; erect warning notices around the area affected that blasting operation are in progress; carry out a thorough search of buildings and the area affected prior to blasting; ensure that blasting is only carried out by experienced shot firers. Priming, charging, stemming and shot firing shall be carried out with greatest regard for safety and in strict accordance with the rules and regulations of the relevant authorities.

Ensure that explosive charges are not excessive, charged boreholes are properly protected and proper precautions are taken for the safety of persons and property.

The Contractor shall maintain an up-to-date inventory of all explosives and explosive devices and shall submit a monthly report to the Project Manager, detailing the use of all explosives by date and location.

6.5.16 Excavation and Trenching

An excavation permit signed by the Project Manager must be issued before excavation proceeds in any work location. The contractor shall investigate and identify the location of existing services by study of the drawings, a visual/physical study of the site, sweeping by appropriate detection equipment and where necessary hand excavation of trial holes.

Following this investigation, the Contractor shall submit a written request for an excavation permit to the Project Manager.
The Project Manager will return the permit signed and dated to indicate:
Services which are to be maintained. Services which are to be isolated. Any special precautions to be

taken.

A sample Excavation Permit is given in Annex 1 to this Specification. The issue of an Excavation Permit by the Project Manager shall not relieve the Contractor of his responsibilities under the Contract.

The side of all excavations and trenches which in the opinion of the Project Manager might expose personnel or facilities to danger resulting from shifting earths shall be protected by adequate temporary supports or sloped to the appropriate angle of repose.

All excavations, slopes and temporary supports shall be inspected daily and after each rain, before allowing personnel to enter the excavation.
Excavations 1.3 metres or more in depth and occupied by personnel shall be provided with ladders as a means for entrance and egress. Ladders shall extend not less than 1 metre above the top of the excavation.

The Contractor shall provide adequate barrier protection to all excavations. Barriers shall be readily visible by day of night.
Excavated or other materials shall be stored at least 0.65 metres from the sides of excavations.

6.5.17 Concrete Reinforcement Starter Bars

The Contractor shall ensure concrete reinforcement starter bars are not a danger to personnel. Where permitted by the Project Manager, starter bars shall be bent down. Alternatively, the starter bars shall be protected using either hooked starters, plastic caps, plywood covers or other methods agreed with the Project Manager.

6.6 Environmental and Health Requirements

6.6.1 Protection of the Environment

The Contractor shall be knowledgeable of and comply with the Environmental Management Plan (EMP) and with all environmental laws, rules and regulations for materials, including hazardous substances or wastes under his control. The contractor shall not dump, release or otherwise discharge or dispose of any such materials without the authorization of the Project Manager.

Any release of a hazardous substance to the environment, whether air, water or ground, must be reported to the Project Manager immediately. When releases resulting from Contractor action occur, the Contractor shall take proper precautionary measures to counter any known environmental or health hazards associated with such release. These would include remedial procedures such as spill control and containment and notification of the proper authorities.

6.6.2 Air Pollution

The Contractor, depending on the type and quantity of materials being used, may be required to have an emergency episode plan for any releases to the atmosphere. The Contractor shall also be aware of local ordinances affecting air pollution.
The Contractor shall take all necessary measures to limit pollution from dust and any wind blown materials during the Works, including damping down with water on a regular basis during dry climatic conditions.

The contractor shall ensure that all trucks leaving the Site are properly covered to prevent discharge of dust, rocks, sand, etc.

6.6.3 Water Pollution

The contractor shall not dispose of waste solvents, petroleum products, toxic chemicals or solutions on

the city drainage system or watercourse, and shall not dump or bury garbage on the Site. These types of waste shall be taken to an approved disposal facility regularly, and in accordance with requirements of relevant Authorities. The Contractor shall also be responsible for the control of all run-offs, erosion, etc.

6.6.4 Solid Waste

General Housekeeping

The Contractor shall maintain the site and any ancillary areas used and occupied for performance of the Works in a clean, tidy and rubbish-free condition at all times.
Upon the issue of any Taking-Over Certificate, the Contractor shall clear away and remove from the Works and the Site to which the Taking-Over Certificate relates, all Contractor's Equipment, surplus material, rubbish and Temporary Works of every kind, and leave the said Works and Site in a clean condition to the satisfaction of the Project Manager. Provided that the Contractor shall be entitled to retain on Site, until the end of the Defects Liability Period, such materials, Contractor's Equipment and Temporary Works as are required by him for the purpose of fulfilling his obligations during the Defects Notification Period.

Rubbish Removal and Disposal
The Contractor shall comply with statutory and municipal regulations and requirements for the disposal of rubbish and waste.

The Contractor shall provide suitable metal containers for the temporary storage of waste.
The Contractor shall provide suitable metal containers from site as soon as they are full. Rubbish containers shall not be allowed to overflow.

The Contractor shall provide hard standings for and clear vehicle access to rubbish containers.
The Contractor shall provide enclosed chutes of wood or metal where materials are dropped more than 7 meters. The area onto which the material is dropped shall be provided with suitable enclosed protection barriers and warning signs of the hazard of falling materials. Waste materials shall not be removed from the lower area until handling of materials above has ceased.

Domestic and biodegradable waste from offices, canteens and welfare facilities shall be removed daily from the site.

Toxic and hazardous waste shall be collected separately and be disposed of in accordance with current regulations.

Asbestos Handling and Removal
The Contractor shall comply with all local regulations regarding the handling of asbestos materials. In the absences of local regulations, relevant International Standards shall apply.
Pest Control
The Contractor shall be responsible for the rodent and pest control on the Site. If requested, the contractor shall submit to the Project Manager, for approval, a detailed programme of the measures to be taken for the control and eradication of rodents and pests.

6.6.5 Noise Control

The Contractor shall ensure that the works is conducted in a manner so as to comply with all restrictions of the Authorities having jurisdiction, as they relate to noise.
The Contractor shall, in all cases, adopt the best available plant/and or machinery shall be used. All

equipment shall be maintained in good mechanical order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable. Stationary noise sources shall be sited as far away as possible from noise-sensitive areas and, where necessary, acoustic barriers shall be used to shield them. Such barriers may be proprietary types, or may consist of site materials such as bricks or earth mounds as appropriate.
Compressors, percussion tools and vehicles shall be fitted with effective silencers of a type recommended by the manufacturers of the equipment. Pneumatic drills and other noisy appliances shall not be used during days of rest or after normal working hours without the consent of the Project Manager.

Areas where noise levels exceed 90 decibels, even on a temporary basis, shall be posted as high noise level areas.

6.7 Additional Requirements for Work in Public Areas

6.7.1 General

Those additional requirements shall apply to all works carried out in Public Areas.
Public Areas are defined as areas still used by or accessible to the public. These include public roads and pavements, occupied buildings and areas outside the Contractor's boundary fencing.
All work in Public Areas shall be carried out to minimize disturbance and avoid dangers to the public.

Before commencing work, the Contractor shall ensure that all necessary resources, including labour, plant and materials will be available when required and that the works will proceed without delays and be completed in the shortest possible time. Period of inactivity and slow progress or delays in meeting the agreed programme for the Works, resulting from the Contractor's failure to provide necessary resources or other causes within the control of the Contractor, will not be accepted.
In the event of such inactivity, slow progress or delays, the Contractor shall take immediate action to rectify the situation, including all possible acceleration measures to complete the works within the agreed programme.
Details of the actions and acceleration measures shall be submitted to the Project Manager. If the Project Manager is dissatisfied with the Contractor's proposals, the Contractor shall take such further actions or measures as required by the Project Manager. All costs incurred shall be the responsibility of the Contractor.

6.7.2 Method Statement

The Contractor shall submit to the Project Manager a method statement for each separate area or work in Public Areas. The Method Statement shall include:
a general description of the Works and methodology of how it will be carried out.

Details of the measures and temporary works to minimise disturbance and safeguard the public. These shall include temporary diversions, safety barriers, screens, signs, lighting, watchmen and arrangements for control of traffic and pedestrians and advance warning to be given to the public.

Details of temporary reinstatement and maintenance of same prior to final reinstatement.

For works involving long lengths of trenches or works to be completed in sections, the lengths or sections of each activity (e.g. up to temporary reinstatement, final reinstatement) to be carried out at any one time.
Details of the availability of necessary resources (labour, plant, materials, etc.) to complete the work.

A programme showing start and completion dates and period for all activities of each length or section, including temporary works, and the works overall.
Such further information as necessary or required by the Project Manager.

The Contractor shall not commence work, including temporary works, until after the approval of the Contractor's Method Statement by the Project Manager.
Method Statements shall be updated bases on actual progress or as and when required by the Project Manager.

6.7.3 Closure of Roads, Etc.

The closure or partial closure of roads, pavements and other public areas will only be permitted if approved by the Project Manager and Relevant Authorities. The Contractor shall detail for each closure the extent of area to be closed, the reasons and duration of the closure, and where appropriate, proposed diversions. A sample Street Closure Permit is given at Annex 2 to this Specification.

6.7.4 Trench and Other Excavations

The requirements covering trench and other excavations will depend on the location and type of the excavation and the potential risks to the public.
The following guidelines apply particularly to trenches but shall also apply to other types of excavations: before commencing work the Contractor shall:
Notify the Project Manager of the location and duration of the work. An excavation permit signed by the Project Manager must be issued in accordance with Sub-Clause 705.16 before excavation proceeds in any work location;
obtain permission from relevant authorities including the police when required;
erect all temporary works such as barriers, warning signs, lighting, etc.;
Have available adequate materials for temporary supports to sides of excavations and necessary labour, plant and materials to complete the work within the shortest possible time.
In carrying out the works the Contractor shall, unless otherwise permitted or required by the Project Manager:
not open more than one excavation within a radius of 250 metes;
limit the length of trench excavation open at one time to 150 metres;
maintain and alter or adapt all temporary works including supports to sides of excavations;
remove all surplus excavated material the same day it is excavated;
complete the works, including final reinstatement within ten days;
where final reinstatement is not achieved within the required time, to carry out temporary reinstatement;
Ensure that any temporary reinstatement is maintained at the correct level until final reinstatement is achieved.
The above guidelines shall not relieve the Contractor of his obligations and responsibilities.

6.7.5 Safety Barriers

Safety barriers shall be provided to the perimeter of work areas and to trench and other types of excavations and to existing openings such as manholes, drawpits and the like. When exposed to the public, safety barriers shall be provided to both sides and ends of trenches and around all sides of openings.

The Contractor shall provide details of the type or types of safety barriers for each excavation for the approval of the Project Manager prior to commencing work. No work shall commence until the safety barriers are in place.

The type of safety barrier used shall be appropriate to the particular location and the potential risks to the public. Examples of different types of safety barriers are given below:
Type 1 - excavated material;
Type 2 - non-rigid barrier of rope or florescent tape strung between metal rods driven into the ground;
Type 3 - rigid barrier of timber, steel or concrete. Such barriers could be in the form of horizontal rail(s)

or sheet material secured to posts driven or concreted onto the ground.
The following are guidelines on the type of safety barriers that could be used in differing situations. They apply particularly to trenches but also apply to other types of excavation, existing openings onto the perimeter of work areas:
Areas not subject to vehicular traffic - Types 1 or 2; roadways (low traffic speed) - Types 1 or 2;
Roadways (high traffic speed or where excavation are greater than 2 m) - Type 3.

The above examples of the types of barriers and the guidelines on situations in which they could be used shall not relieve the Contractor of his obligations and responsibilities.

6.8 Contractor's Site Check List

A sample Contractor's Site Check List is included in Annex 3 to this Specification. This is included to assist contractors should they wish to introduce such a system as part of their site management procedures. The list is not exhaustive and further items will need to be added by the Contractor.
The list is issued for guidance only, and does not, in any way, revise or limit the requirements covered elsewhere in these Specifications.

Annex 1
Sample Excavation Permit

To: (Project Manager or his representaative)

From: (Contractor)
Date: …….

Contract No:
Request for Excavation Permit No: ……
Please give approval for excavation to proceed in the following area: Work to start on:
Existing services have been checked and identified by: Drawings # Physical Survey #
Catscan# Trial Holes Excavation #

Signed (Contractor): ……

Approval by Project Manager

The above excavation may proceed, subject to the following: Service to be maintained:
Services to be isolated before work proceeds: Other matters:
Signed (Project Manager): ……. Date: ……

Annex 2
Sample Street Closure Permit

To: (Project Manager or his representative)
From: …….. (Contractor) Date: ……. Contract No:
Request for Street Closure Permit No: ……

Please give approval for the closure of the following street(s) from …… to (dates)

Street(s):

Reasons:

Proposed diversions:
Signed (Contractor): ……. Approval of the Project Manager
The above street(s) may be closed for the periods stated subject to the following conditions: Approval has been given by the relevant authorities and the police;
Other:

Signed (Project Manager): ……. Date: ……..

Annex 3
Sample Contractor's Site Check List Safe Access:
arrangements for visitors and new workers to the site
safe access to working locations
walkways free from obstructions
edge protection to walkways over 2m above ground
holes fenced or protected with fixed covers
tidy site and safe storage of materials
waste collection and disposal
chutes for waste disposal, where applicable
removal or hammering down of nails in timber
safe lighting for dark or poor light conditions
props or shores in place to secure structures, where applicable
Ladders:
to be used only if appropriate
good condition and properly positioned
located on firm, level ground
Secure near top. If not possible, to be secured near bottom, weighted or footed to prevent slipping
top of ladder minimum 1 metre above landing place
Scaffolding:
design calculation submitted
proper access to scaffold platform
properly founded uprights with base plates
secured to the building with strong ties to prevent collapse
braced for stability
load bearing fittings, where required
uprights, ledgers, braces and struts not to be removed during use
fully boarded working platforms, free from defects and arranged to avoid tipping or tripping
securely fixed boards against strong winds
adequate guard rails and toe boards where scaffold is 2m above ground
designed for loading with materials, where appropriate
evenly distributed materials
barriers or warning notices for incomplete scaffold (i.e. not fully boarded)
weekly inspections and after bad weather by competent person
record of inspections
Excavation:
underground services to be located and marked, precautions taken to avoid them
adequate and suitable timber, trench sheets, props and other supporting materials available on site before excavation starts
safe method for erecting and removal of timber supports
sloped or battered sides to prevent collapse
daily inspections after use of explosives or after unexpected falls of materials
safe access to excavations (e.g. sufficiently long ladder)
barriers to restrict personnel/plant
stability of neighbouring buildings
risk of flooding
materials stacked, spoil and vehicles away from top of excavations to avoid collapse
secured stop blocks for vehicles tipping into excavations
Roof Work:
crawling ladders or boards on roofs more than 10 degrees
if applicable, roof battens to provide a safe handhold and foothold

barriers or other edge protection
Crawling boards for working on fragile roof materials such as asbestos cement sheets or glass. guard rails and notices to same
roof lights properly covered or provided with barriers
during sheeting operations, precautions to stop people falling from edge of sheet
precautions to stop debris falling onto others working under the roof work
Transport and Mobile Plant:
in good repair (e.g. steering, handbrake, footbrake)
trained drivers and operators and safe use of plant
secured loads on vehicles
passengers prohibited from riding in dangerous positions
propping raised bodies for tipping lorries prior to inspections
Control of on-site movements to avoid danger to pedestrians, etc.
control of reversing vehicles by properly trained banksmen, following safe system of work
Machinery and Equipment:
adequate secured guards in good repair to dangerous parts, e.g. exposed gears, chain drives, projecting engine shafts
Cranes and Lifting Appliances:
weekly recorded inspections
regular inspections by a competent person
test certificates
competent and trained drivers over 18 years of age
clearly marked controls
checks by driver and banksman on weight of load before lifting
efficient automatic safe load indicator, inspected weekly, for jib cranes with a capacity of more than one tonne
firm level base for cranes
sufficient space for safe operation
trained banksman/slinger to give signals and to attach loads correctly, with knowledge of lifting limitation of crane
for cranes with varying operating radius, clearly marked safe working loads and corresponding radii
regular maintenance
lifting gear in good condition and regularly examined
Electricity:
measures to protect portable electric tools and equipment from mechanical damage and wet conditions
checks for damage to or interference with equipment, wires and cables
use of correct plugs to connect to power points
proper connections to plugs; firm cable grips to prevent earth wire from pulling out “permit-to-work” procedures, to ensure safety
disconnection of supplies to overhead lines or other precautions where cranes, tipper lorries, scaffolding, etc. might touch lines or cause arcing
Cartridge Operated Tools:
Maker’s instruction being followed
properly trained operators, awareness of dangers and ability to deal with misfires
safety goggles
regular cleaning of gun
secure place for gun and cartridges when not in use
Falsework/formwork:
design calculations submitted method statement dealing with preventing falls of workers
appointment of falsework coordinator
checks on design and the supports for shuttering and formwork
safe erection from steps or proper platforms
adequate bases and ground conditions for loads
plumb props on level bases and properly set out
correct pins used in the props

timberwork in good condition
inspection by competent person, against agreed design, before pouring concrete

Risks to the Public:

Identify all risks to members of the public on and off site, e.g. materials falling from scaffold etc., site plant and transport (access/egress) and implement precautions, e.g. scaffold fans/nets, banksmen, warning notices, etc.
barriers to protect/isolate persons and vehicles
Adequate site perimeter fencing to keep out the public and particularly children. secure the site during non-working periods
make safe specific dangers in site during non-working periods, e.g. excavations and openings covered or fenced, materials safely stacked, plant immobilized, ladders removed or boarded

Fire – General:

sufficient number and types of fire extinguishers
adequate escape routes, kept clear
worker awareness of what to do in an emergency
Fire – Flammable Liquids:
proper storage area
amount of flammable liquid on site kept to a minimum for the day's work
smoking prohibited; other ignition sources kept away from flammable liquids
proper safety containers
Fire – Compressed Gases, e.g. Oxygen, LPG, Acetylene:
properly stored cylinders
valves fully closed on cylinders when not in use
adopt "hot work" procedures
site cylinders in use outside huts
Fire – Other Combustible Materials:
minimum amount kept on site
proper waste bins
regular removal of waste material

Noise:

assessment of noise risks
noisy plant and machinery fitted with silencers/muffs
ear protection for workers if they work in very noisy surroundings

Health:

identify hazardous substances, e.g. asbestos, lead, solvents, etc., and assess the risks
use of other substances where possible
control exposure by means other than by using protective equipment
safety information sheets available from the supplier
safety equipment and instructions for use
keep other workers who are not protected out of danger areas
Testing of atmosphere in confined spaces; provision of fresh air supply if necessary. Emergency procedures for rescue from confined spaces

Manual Handling:

avoid where risk of injury
if unavoidable, assess and reduce risks

Protective Clothing:

suitable equipment to protect head, eyes, hands and feet here appropriate
enforce wearing of protective equipment

Welfare:

suitable toilets
clean wash basin, hot/warm water, soap and towel
room or area where clothes can be dried
wet weather gear for those working in wet conditions
heated site hut where workers can take shelter and have meals with the facility for boiling water

suitable first aid facilities
Work in Public Areas:
all risks to the public identified
method statement approved
road closures approved
temporary diversions in place
safety barriers erected/maintained
labour, materials, plant and other resources sufficient to meet programme
temporary reinstatement completed and properly maintained
Permanent reinstatement completed at earliest possible date.

7.0 ENVIRONMENTAL IMPACT MITIGATION

7.1General

All construction related environmental impacts can be mitigated with the observation of good construction practice and careful on site monitoring. The Contractor shall abide by all the provisions of the Project Environmental Management Plan (hereinafter referred to as the EMP), Environmental Impact Assessments (EIAs), Environmental Social Impact Assessment (ESIA), NEMA Environmental Permit, all related laws, standards and directives in force in Kenya, and with any amendment thereof introduced during the execution of his Contract.

The Clauses should be read in conjunction with those in the General Specification. In the event of any ambiguity or discrepancy this specification shall take precedence.

7.2 Method Statements

The Contractor shall provide in a timely manner a Method Statement for any mitigation measures in the EMP, EIA, ESIA and NEMA Permit for which the Project Manager requests a separate Method Statement. Should the method of work proposed by the Contractor be unacceptable to the Project Manager, the Contractor shall provide a revised Method Statement.

The work will not be allowed to proceed until a Method Statement has been approved by the Project Manager. Method Statements to be provided should include, but not be limited to the following: Site Clearance; Landscape Planting and Site Rehabilitation; Traffic Management Plan; Environmental Monitoring (Air, Water and Noise); Health and Safety Plan; Emergency Management and Disaster Preparedness Plan (to include hurricanes, earthquakes, flooding, fire, oil spills, etc.); Traffic Management Plan

7.3 QSE Reporting, Inspections and Audits

The Contractor shall provide the Project Manager with a monthly Quality, Safety and Environment (QSE) report no later than 7 days after the end of the reporting month and be subject to regular QSE system inspections and audits by the Project Manager.

7.4 Environmental Monitoring and Reporting

The Contractor is required to put in place a programme of regular environmental monitoring for air quality, water quality and noise to meet the requirements and conditions of the EMP, EIAs, and NEMA Permit. The monitoring programme should be conducted in accordance with a Method Statement which has been approved by the Project Manager and the appropriate regulatory agency. Reports on the monitoring programme should be submitted to the Project Manager and the relevant regulatory agency.

7.5 Access Requirements for Supervision

Any Officer or Agent authorized in writing by the TWWDA, NEMA, their agents or other organization for which

from time to time it may be necessary, may at any time enter any premises whether prescribed or otherwise and may: Examine and inspect equipment, control apparatus, monitoring instruments or plant; Take samples of any material that is emitted, discharged or deposited, or is likely to be, from such premises; Examine any books, records or documents relating to the performance or use of such equipment, apparatus, instruments or plant, or relating to the emission, discharge or deposit from such premises; and Photograph such premises as is considered necessary or make copies of any book, records or documents seen in the course of examination.

7.6 Conditions of Site

Before carrying out any work on any Site, the Site shall be inspected by the Contractor in conjunction with the Project Manager to establish its general condition, which shall be agreed and recorded in writing, and where in the opinion of the Project Manager it is deemed necessary, by means of photography.

7.7 Adjoining Property

The Contractor shall advise owners, occupiers and users of the dates on which work is to be executed on adjacent property not less than 48 hours prior to commencement, and take all reasonable precautions to prevent collateral damage and, if any damage is caused, make good to the satisfaction of the owner at the Contractor's expense

7.8 Landscape

The Contractor shall exercise care to preserve the natural landscape and shall conduct his operations so as to prevent any unnecessary destruction, scarring or defacing of the natural surroundings in the vicinity of the work.

Except where clearing is required for permanent works, all trees, native shrubbery and vegetation shall be preserved and shall be protected from damage that may be caused by the Contractor's equipment and operations.

No trees shall be cut down outside defined work site boundaries without the specific approval of the Project Manager. The trees identified for preservation should be flagged prior to the commencement of clearing activities.

Where unnecessary destruction or defacing of landscape or natural vegetation, has occurred the Contractor shall be responsible for repairing, replanting or otherwise correcting the damage at his own expense.

7.9 Site Clearance

Materials other than topsoil arising out of site clearance shall be disposed by the Contractor off the Site, or where approved by the Project Manager, on the site in a manner and place approved by the Project Manager.

The extent and depth of topsoil to be removed shall be agreed with the Project Manager. Topsoil shall be set aside for subsequent re-use or disposal as directed by the Project Manager, and will be stored in such a manner as will preserve its fertility until such time as re-use or disposal is directed.

7.10 Ecosystems and Wildlife

The Contractor shall institute penalties for construction workers, including those of sub-contractors, who unnecessarily damage or destroy wildlife and other features of the natural ecosystem. Summary dismissal shall be the penalty for workers found collecting eggs or illegally partaking in the trading of species or any activity involving the unwarranted disturbance of any protected species, on or off construction sites.

7.11 Access to Work Sites

The mitigation of the impacts from construction traffic can take three forms; access control, road cleaning and definition of approved routes. For access control, the Contractor shall restrict turning movements to approved access points to and from existing highways and, if necessary, improve existing junction layouts to reduce the potential for accidents.

Restrictions on the timing of use, with construction traffic prohibited outside of specified, supervised hours, may also

be required. Road cleaning measures will be required to ensure roads are kept in a safe condition, that surplus oil, mud and other materials are removed on a regular basis.

Prior to commencement of the Contract, the Contractor shall submit for the approval of the Project Manager a Traffic Management Plan outlining points of access to the primary road network, additional traffic control measures to be implemented, proposals for signage and road cleaning together with a programme for these activities.

Wide or abnormal load movements shall wherever possible be transported during the early hours of the morning. Appropriate times of operation would be between 2300 and 0500 hours. Such loads will require specific obstruction-free routes to be defined in consultation with the Kenyan Constabulary. These details, together with the proposed timings of the movement shall be submitted to the relevant authorities and the Project Manager for approval. Garage and maintenance areas for vehicles should have oil and grease interceptors for wash water.

7.12 Dislocation of Existing Access

On the basis of the information contained in his Programme of Works, the Contractor shall prepare a plan of diversions and temporary works for approval by the Project Manager. The plan shall include details of to the proposed works, arrangements for signage, the timing of the proposed closure and works with start date, reopening date and the hours of closure, and the programme of making good.

7.13 Public Utilities

At the commencement of the Contract, the Contractor shall examine the site and identify/verify all utilities above or below ground, and shall record all such information on suitable Site Drawings, which shall be submitted to the Project Manager within one month of commencement of the Works. The Contractor shall for this purpose excavate trial pits or take any other measures needed as may be necessary for identification and verification of existing utilities.

The Contractor shall request of the utility agencies confirmation and definition of all utilities sites in and adjacent to all construction sites. The Contractor shall liaise with the agencies responsible for the maintenance of utilities that may be crossed, temporarily diverted or in any other way affected by construction works as to the timing and nature of the works proposed. Any curtailment of a utility service shall only be undertaken with the prior approval of the service provider and the Project Manager.

Damage to any utility will be made good to the satisfaction of the utility agency at the Contractor's cost. Such repair work shall be treated as an emergency and undertaken without undue delay, notwithstanding that the Project Manager may not be immediately available. All such damage shall be reported in writing to the Project Manager with details of the remedial action undertaken.

7.14 Wastewater Disposal

The Contractor shall submit a proposed plan for the disposal of wastewater from the construction camp and all other sites at which it will be generated to the Project Manager for approval. Prior to installation, the Contractor shall obtain approval for proposed disposal system from all appropriate agencies and from the Project Manager.

7.15 Solid Waste Disposal

Where possible, all on and off site facilities shall be included in the existing municipal solid waste collection and disposal process.

The Contractor shall provide any necessary special handling and treatment of any generated solid waste and separate such materials from other waste for collection and disposal. If it is not considered feasible or desirable to incorporate sites into established municipal waste collection systems, the Contractor shall collect and transport materials to an approved landfill site.

The normal manner of disposal shall include all necessary precautions to prevent air, soil and water air pollution, drainage impedance, fire hazard and damage to ecosystems.

7.16 Soil Pollution

The Contractor shall be required to perform all construction activities by methods that will prevent pollution of the

soil by accidental spillage of solid or liquid contaminants.
If a significant spillage does occur the Contractor shall remove all contaminated soil in a manner and to a site specified by the Project Manager. Where necessary, appropriate replacement material shall be laid. The costs of these actions and related materials shall be borne by the Contractor.

7.17 Surface Watercourses

Work adjacent to or in surface watercourses and drainage channels shall allow for the maintenance of flow and avoid discoloration.

7.18 Water Pollution

The Contractor shall comply with all applicable regulations concerning the control and abatement of water pollution in Kenya. The Contractor's construction activities shall be performed by methods that will prevent the entrance or accidental spillage of solid matter or liquid contaminants, debris and wastes to watercourses, drainage ditches and ground water aquifers.
In the event of a serious spill, and contamination, the Contractor shall notify relevant authorities and the Project Manager immediately. Any remedial works instructed, shall be undertaken by the Contractor or any other specified body at the contractor’s expense. Such work shall be undertaken as a matter of urgency. Intentional failure or delay in issuing notification of such spills, or to implement remedial works, shall be considered a Breach of Contract.

7.19 Erosion

The Contractor shall at all times take care to prevent erosion of areas which may be affected by his operations and the Project Manager may impose such reasonable limitations and restrictions upon the method and timing of work as the circumstances warrant.
All temporary discharge points shall be located, designed and constructed in a manner that will minimize the potential threat of erosion in the receiving channels. The Method Statements for Site Clearance and for Landscaping and Site Rehabilitation should address the issue of soil erosion and sediment discharge.

7.20 Risk of Flooding

The Contractor's attention is drawn to the risk of flooding during storms and shall take appropriate precautions to ensure surface water is free to flow naturally and shall not cause obstructions liable to increase the risk of flooding.
Watercourses upstream of the road shall not be interfered with, altered or diverted, and materials shall not be stored or deposited across a watercourse, culvert or drain entry so as to obstruct any natural flow of surface water. All works shall be adequately protected and marked so as not to increase the risk of injury or damage to the works, persons, vehicles, etc. in the event of flooding.
The Contractor should take steps to ensure that storm water entering watercourses should be free from silt and suspended materials. The Contractor shall bear all costs and expenses for protection works which he executes including construction of temporary diversion banks and channels and all necessary works against flooding.

7.21 Aggregate. Fill and Spoil Heaps

The contractor shall ensure that all such heaps are located at sites that are generally on land, with slopes of less than 1.5% and that do not permit direct run off to water courses. Aggregate stockpiles shall not exceed their natural angle of repose unless structurally supported. The onsite storage of excessive quantities materials shall be avoided. All such heaps shall be of a size and stability to ensure the risk of mass movement during periods of intense rainfall is minimized. Where necessary a shed or tarpaulin cover may need to be provided to prevent erosion from wind and rain.

7.22 Noise

The Contractor shall ensure that all the equipment utilized in the construction of the project is fitted with appropriate noise muffling devices that conforms to the following sound level emissions

Equipment and vehicles that are excessively noisy due to poor engine adjustment, damaged noise amelioration equipment, or other inefficient operating conditions shall not be operated until corrective measures are taken. The Contractor shall ensure plant operated intermittently is shut down, or at a minimum throttled down during idle periods.

In general, noisy operations shall be restricted to between 7 am and 9 pm, and not undertaken on public, religious or other holidays.
The public shall be informed of the expected time and duration of works that may emit significant noise levels. Noise sensitive areas should be identified by the Contractor and a programme of regular monitoring designed and implemented by the Contractor. Piling operations should be restricted to the hours of 9 am and 4 pm. Advance notice by the Contractor of work starts of at least 5 days shall be given to residents or users of properties within 50 m of a piling site. Such notice shall take the form of public notices displayed within affected neighborhood.
Approval to extend periods of operation may be given by the Project Manager in consultation with the relevant municipality authority but only where it is necessary to maintain the stability of the Works or for the maintenance of workers and public safety. Extended periods of overtime working shall not be permitted except in the most exceptional cases. Persons living within 50m of the works area designated for extended hours of operation should be informed in writing at least 48 hours before the change in operating hours.

7.23 Air Pollution excluding

Dust In the conduct of general construction activities and the operation of equipment, the Contractor shall utilize all practical methods and devices as are reasonably available to control, prevent and otherwise minimize atmospheric emissions or the discharge of air contaminants. This will include: Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustment or other inefficient operating conditions should not be operated unless corrective measures are taken; Burning of materials resulting from the clearance of trees, bushes and combustible materials shall not be permitted.

7.24 Dust

The Contractor shall take all necessary measures to limit pollution from dust and any windblown materials during the works, including damping down with water on a regular basis during dry and windy climatic conditions. All trucks using public roads shall be properly covered to prevent discharge of dust, rock and sand. During the performance of the Works required the Contractor should be responsible for all labour, equipment, materials and the means required to carry out efficient control, wherever and as often as necessary, to prevent dust from his operations from damaging dwellings, crops, or causing a nuisance or health hazard to persons.

Specific dust suppression measures may include: The provision of water troughs at entry and exit points to prevent the carry over, beyond the construction site, of dust emissions; Use of appropriate hoardings; Using coverings for all vehicles transporting materials likely to give off excessive dust emissions. Vehicles should not be overloaded above the freeboard. The Contractor will be held liable for any damage resulting from dust originating from his operations.

7.25 Storage of Fuel

All fuel storage tanks shall be located on hard standing and bunded to prevent the outflow of any spilt fuel. The capacity of the bunded area shall be 110% of the volume of the fuel storage. Each installation shall be complete with all protective guards and warning signs as approved by the Project Manager.

7.26 Oil and Grease

All oils and greases shall be kept secure under cover and where it will not normally come in contract with drainage channels or watercourses. The disposal of waste oil, grease and other hydrocarbon products shall be to a disposal facility licensed to take such materials, and to the approval of the Project Manager.

7.27 Hazardous Materials

The Contractor shall submit to the Project Manager an inventory of all potentially hazardous materials to be stored on site, together with a preliminary indication of the quantities of material that may be present at any one time. A Materials Safety Data Sheet (MSDS) should be kept on file for every chemical in the inventory and be available on site. Facilities for the storage, handing and use of such materials shall be in accordance with manufactures' recommendations, MSDS, and to the approval of the Project Manager. Facilities for the storage of classified hazardous materials, whether the buildings in which containers are stored or the containers themselves, shall be clearly identified with the standard HAZCHEM markings, and access to them permitted only to authorized personnel. No waste or surplus hazardous chemical shall be disposed of unless approval is obtained in writing from the Project Manager, identifying the nature

of the material, the amount, details of origin and any batch reference, and the location and method of disposal. Staff and sub-contractors staff should be trained in the proper storage, use and disposal of these hazardous materials and provided with the appropriate Personal Protective Equipment

7.28 Landscape Planting

Areas to be planted shall be soiled with good quality fertile soil not less than 300 mm compacted thickness, which shall be raked and brought to a fine tilth. Species to be planted and their spacing shall be approved by the Project Manager and the areas shall be watered and attended until the plants have become well established. The Contractor shall supply attendance during the Defects Liability Period to ensure that all planted areas are kept weeded and watered, with die back removed and replaced as necessary. A Method statement for Landscaping is required.

7.29 Operations Maintenance Manuals and (O&M)

O&M Manuals developed by the Contractor should address all issues contained within the EMP, EIA, ESIA and the NEMA permit in respect of Operational Monitoring.

SECTION VII - DRAWINGS

Note: A list of drawings is attached separately.

SUPPLEMENTARY INFORMATION

None.

PART 3 – CONDITIONS OF CONTRACT AND CONTRACT FORMS