



**WATER SECTOR TRUST FUND
(WSTF)**



**MURANG'A SOUTH WATER AND
SANITATION COMPANY LTD**

TENDER NAME: PROPOSED CONSTRUCTION OF DECENTRALISED TREATMENT FACILITY (DTF) IN SABASABA TOWN- MURANG'A COUNTY

TENDER NO: MUSWASCO/NCB/TENDER/NOV-19/20(2)

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Employer:

Managing Director
Murang'a South Water & Sanitation
Company Ltd.
P.O. BOX 321-20117
Naivasha

Funding

Chief Executive Officer
Water Sector Trust Fund
P.O. Box 49699-00100
Nairobi

NOVEMBER 2019

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ABBREVIATIONS AND ACRONYMS

CDS	Contract Data Sheet
GCC	General Conditions of Contract
IFT	Invitation for Tender
ITT	Instruction to Tenderers
PE	Procuring Entity
PM	Project Manager
PPAD 2015	Public Procurement and Assets Disposal Act, 2015
PPDR 2006	Public Procurement and Disposal Regulations, 2006
PPOA	Public Procurement Oversight Authority
STD	Standard Tender Documents
SOR	Statement of Requirements
SP	Service Provider
TDS	Tender Data Sheet
VAT	Value Added Tax

A. INTRODUCTION

Procurement for works under public-financed projects is carried out in accordance with policies and procedures laid down in The Public Procurement and Asset Disposal Act 2015.

This Standard Tendering Document (STD) for procurement of works has been prepared for use by the Procuring Entities in Kenya in the procurement of Works through National Competitive Tendering (NCB) procedures.

This STD is mandatory for use in works contracts of a value not exceeding KShs.200 million, as defined in The Public Procurement and Asset Disposal Act 2015.

The following guidelines should be observed when using the document:

- (i). Specific details should be furnished in the Invitation for Tenders and in the Contract Data Sheet (where applicable). The Tender document issued to Tenderers should not have blank spaces or options;
- (ii). The Instructions to Tenderers and the General Conditions of Contract should remain unchanged. Any necessary amendments to these parts should be made through the Tender Data Sheet and Contract Data Sheet respectively;
- (iii). Information contained in the Invitation for Tenders shall conform to the data and information in the Tender documents to enable prospective Tenderers to decide whether or not to participate in the Tender and shall indicate any important Tender requirements;
- (iv). The Invitation for Tenders shall be as an advertisement in accordance with the regulations or a letter of invitation addressed to Tenderers who have been prequalified following a request for prequalification.

The cover of the document shall be modified to include:

- a. Tender number;
- b. Tender name;
- c. Name of Procuring Entity;

SECTION I: INVITATION FOR TENDERS (IFT) INVITATION TO TENDER OPEN NATIONAL TENDER

MURANG'A SOUTH WATER AND SANITATION COMPANY Ltd has received funds from the Water Sector Trust Fund under the UPscaling Basic Sanitation for the Poor(UBSUP) and intends to use part of the funds to undertake the following projects. The Company hereby invites bids from eligible firms to undertake the following works.

Item No.	Tender Type and Number	Pre - Tender Site Visit
1.	No. MUSWASCO/NCB/TENDER/NOV-19/20(2) Construction of Decentralised Treatment Facility (DTF) in SABASABA Town- MURANG'A County	Tuesday 26 th November, 2019, 10.00AM AT MUSWASCO'S OFFICE AND THE SITE.

Requirements

1. Must be a registered contractor with the National Construction Authority (NCA 7 and above)
2. Bid Security of 2% of the tender sum from a reputable financial institution or inform of a bankers cheque.
3. Provide **Certified** Audited accounts for the last 3 years
4. Certified copies of Tax Compliance Certificate, VAT and PIN Certificates
5. Proof of Legal existence (Copies of Certificates of Incorporation /Registration)
6. Valid Business Permit issued by County Government
7. Certificate of Pre - tender site visit signed by authorized officer

Tender documents with detailed specifications can be downloaded by interested bidders from our website www.muswasco.co.ke free of charge. After downloading the document send an email to murangasouth@gmail.com for you to be registered. Further information and inspecting of tender document (including bill of quantities) can be done at MURANGA SOUTH WATER AND SANITATION COMPANY LIMITED, Opposite DC's Office in Kandara- Procurement Office during normal working hours.

Completed tender documents in a plain sealed envelope bearing no indication of the tenderer but clearly marked with the "Tender No. MUSWASCO/NCB/TENDER/NOV-19/20(2) for Construction of Decentralised Treatment Facility" should be addressed to:

The Managing Director
Murang'a South Water and Sanitation Company Ltd,
P.O Box 87 - 01034,
Kandara.

The sealed tender document should be sent through the above address or lodged in the Tender Box marked at the Company's office Head offices located at Kandara, on or before Friday 13th December, 2019 not later than 10:30 am. Tenders will be opened immediately thereafter at the Company's Boardroom in the presence of the interested tenderers or their representatives who chose to attend.

SECTION II: INSTRUCTIONS TO TENDERERS (ITT)

A. Introduction

1. Scope of Tender

The Procuring Entity indicated in the Tender Data Sheet (TDS) invites Tenders for the construction of works as specified in the Tender Data Sheet and Sections VI (Technical Specifications) and VII (Drawings).

The successful Tenderer will be expected to complete the works by the required completion date specified in the Tender Data Sheet.

The objectives of the works are listed in the Tender Data Sheet. These are mandatory requirements. Any subsequent detail is offered to support these objectives and must not be used to dilute their importance.

2. Source of Funds

Procuring Entity named in the Tender Data Sheet has received grant from the financing institution named in the Tender Data Sheet towards the cost of the Project named in the Tender Data Sheet and intends to apply a part of the proceeds of this grant to payments under the Contract described in the Tender Data Sheet.

- 2.1 Payments will be made directly by the Procuring Entity (or by financing institution specified in the Tender Data Sheet upon request of the Procuring Entity to so pay) and will be subject in all respects to the terms and conditions of the resulting contract placed by the Procuring Entity.

3. Eligible Tenderers

A Tenderer may be a natural person, private or public company, government-owned institution, subject to sub-Clause 3.4 or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a joint venture, consortium, or association. In the case of a joint venture, consortium, or association, unless otherwise specified in the Tender Data Sheet, all parties shall be jointly and severally liable.

The Invitation for Tenders is open to all suppliers as defined in the Public Procurement and Assets Disposal Act, 2015 and the Public Procurement and Disposal Regulations, 2006 except as provided hereinafter.

National Tenderers shall satisfy all relevant licensing and/or registration with the appropriate statutory bodies in Kenya, such as the Ministry of Public Works or the Energy Regulatory Commission.

A Tenderer shall not have a conflict of interest. All Tenderers found to have a conflict of interest shall be disqualified. A Tenderer may be considered to have a conflict of interest with one or more parties in this Tendering process, if they:

- a) Are associated or have been associated in the past directly or indirectly with employees or agents of the Procuring Entity or a member of a board or committee of the Procuring Entity;
- b) Are associated or have been associated in the past, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring Entity to provide consulting services for the preparation of the design, specifications and other

documents to be used for the procurement of the works under this Invitation for Tenders;

- c) Have controlling shareholders in common; or
- d) Receive or have received any direct or indirect subsidy from any of them; or
- e) Have the same legal representative for purposes of this Tender; or
- f) Have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Tender of another Tenderer, or influence the decisions of the Procuring Entity regarding this Tendering process; or
- g) Submit more than one Tender in this Tendering process, however, this does not limit the participation of subcontractors in more than one Tender, or as Tenderer and subcontractor simultaneously.

A Tenderer will be considered to have a conflict of interest if they participated as a consultant in the preparation of the design or technical specification of the project and related services that are the subject of the Tender.

Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Kenya in accordance with GCC sub-Clause 3.2.

Government owned enterprises in Kenya may participate only if they are legally and financially autonomous, if they operate under commercial law, are registered by the relevant registration board or authorities and if they are not a dependent agency of the Government.

Tenderers shall provide such evidence of their continued eligibility satisfactory to the Procuring Entity, as the Procuring Entity shall reasonably request.

4. One Tender per Tenderer

A firm shall submit only one Tender, in the same Tendering process, either individually as a Tenderer or as a partner in a joint venture pursuant to ITT Clause 5.

No firm can be a subcontractor while submitting a Tender individually or as a partner of a joint venture in the same Tendering process.

A firm, if acting in the capacity of subcontractor in any Tender, may participate in more than one Tender but only in that capacity.

A Tenderer who submits or participates in more than one Tender (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the Tenders in which the Tenderer has participated to be disqualified.

5. Alternative Tenders by Tenderers

Tenderers shall submit offers that comply with the requirements of the Tendering documents, including the basic Tenderer's technical design as indicated in the specifications and Drawings and Bill of Quantities. Alternatives will not be considered, unless specifically allowed for in the Tender Data Sheet. If so allowed, sub-Clause 5.2 and 5.3 shall govern.

When alternative times for completion are explicitly invited, a statement to that effect will be included in the Tender Data Sheet as will the method of evaluating different times for completion.

If so allowed in the Tender Data Sheet, Tenderers wishing to offer technical alternatives to the requirements of the Tendering documents must also submit a Tender that complies with the requirements of the Tendering documents, including the basic technical design as indicated in the specifications. In addition to submitting the basic Tender, the Tenderer shall provide all information necessary for a complete evaluation of the alternative by the Procuring Entity, including technical specifications, breakdown of prices, and other relevant details. Only the technical alternatives, if any, of the lowest evaluated Tenderer conforming to the basic technical requirements shall be considered by the Procuring Entity.

6. Cost of Tendering

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

7. Site Visit and Pre-Tender Meeting

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

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

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

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

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

Non-attendance during the site visit or be a cause for disqualification of a Tenderer as specified in the **Tender Data Sheet**.

B. Tendering Documents

8. Content of Tendering Documents

The works required, Tendering procedures, and contract terms are prescribed in the Tendering Documents. In addition to the Section I Invitation for Tenders, Tendering documents which should be read in conjunction with any addenda issued in accordance with ITT sub Clause 10.2 include:

Section II	Instructions to Tenderers
Section III	Tender Data Sheet
Section IV	General Conditions of
Contract Section V	Contract Data Sheet
Section VI	Specifications
Section VII	Drawings
Section VIII	Bill of Quantities
Section IX	Forms of Tender
•	Form of Tender
•	Appendix to Tender
•	Confidential Business Questionnaire
•	Integrity Declaration
•	Letter of Acceptance
•	Form of Contract Agreement
Section X	Forms of Security
•	Tender Security Form
•	Tender Securing Declaration
•	Performance Bank or Insurance Guarantee
•	Advance Payment Guarantee
Section XI	Additional Forms
Section XII	Workplan
Section XIII	Evaluation Criteria

The number of copies to be completed and returned with the Tender is specified in the Tender Data Sheet.

The Invitation for Tenders (Section I) issued by the Procuring Entity is not part of the Tendering Documents and is included for reference purposes only. In case of discrepancies between the Invitation for Tenders and the Tendering Documents listed in sub-Clause 8.1 above, the said Tendering Documents will take precedence.

The Procuring Entity is not responsible for the completeness of the Tendering Documents and their addenda, if they were not obtained directly from the authorized staff of the Procuring Entity.

The Tenderer is expected to examine all instructions, forms, terms and specifications in the Tendering documents. Failure to furnish all information required by the Tendering Documents or to submit a Tender substantially responsive to the Tendering documents in every respect will be at the Tenderer's risk and may result in the rejection of its Tender.

9. Clarification of Tendering Documents

A prospective Tenderer requiring any clarification of the Tendering documents may notify the Procuring Entity in writing, e-mail or at the Procuring Entity's address indicated in the Tender Data Sheet.

The Procuring Entity will within the period stated in the **Tender Data Sheet** respond in writing to any request for clarification provided that such request is received no later than the period indicated in the Tender Data Sheet prior to the deadline for the submission of Tenders prescribed in sub-Clause 22.1.

Copies of the procuring entity's response will be forwarded to all Purchasers of the Tendering documents, including a description of the inquiry, but without identifying its source.

Should the Procuring Entity deem it necessary to amend the Tendering documents as a result of a clarification, it shall do so following the procedure under ITT Clause 10.

10. Amendments of the Tendering Documents

Before the deadline for submission of Tenders, the Procuring Entity may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Tenderer, modify the Tendering documents by issuing addenda.

Any addendum issued shall be part of the Tender documents pursuant to sub-Clause 8.1 and shall be communicated in writing, by e-mail to all who have obtained the Tendering documents directly from the Procuring Entity.

In order to allow prospective Tenderers reasonable time in which to take an addendum into account in preparing their Tenders, the Procuring Entity at its discretion shall extend, as necessary, the deadline for submission of Tenders, in accordance with sub- Clause 22.2

C. Preparation of Tenders

11. Language of Tender

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

12. Documents Constituting the Tender

The Tender submitted by the Tenderer shall consist of the following components:

- a) The Form of Tender (in the format indicated in Section IX) completed in accordance with ITT Clause 15, 16 and 17;
- b) Information requested by Instructions to Tenderers ITT sub-Clause 13.2; 13.3 and 13.4;
- c) Tender Security or Tender Securing Declaration in accordance with Instructions to Tenderers ITT Clause 19;
- d) Priced Bill of Quantities;
- e) Qualification Information Form and Documents;
- f) Alternative offers where invited in accordance with Instructions to Tenderers ITT Clause 5;

- g) Written confirmation authorizing the signatory of the Tender to commit the Tenderer in accordance with Instructions to Tenderers ITT sub Clause 19.2; and
- h) And any information or other materials required to be completed and submitted by Tenderers, as specified in the Tender Data Sheet.

13. Documents Establishing Eligibility and Qualifications of the Tenderer

Pursuant to ITT Clause 13, the Tenderer shall furnish, as part of its Tender, documents establishing the Tenderer's eligibility to Tender and its qualifications to perform the contract if its Tender is accepted.

In the event that pre-qualification of potential Tenderers has been undertaken, only Tenders from pre-qualified Tenderers will be considered for award of contract. These qualified Tenderers should submit their Tenders with any information updating the original pre-qualification applications or, alternatively, confirm in their Tenders that the originally submitted pre-qualification information remains essentially correct as of the date of Tender submission. The update or confirmation should be provided in Section IX.

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

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

- a) The Tender shall include all the information listed in the Tender Data Sheet pursuant to sub-Clause 13.3 above for each joint venture partner;
- b) The Tender shall be signed so as to be legally binding on all partners;

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

14. Lots Package

When Tendering for more than one contract under the lots arrangements, the Tenderer must provide evidence that it meets or exceeds the sum of all the individual requirements for the lots being tendered in regard to:

- a) Average annual turnover;
- b) Particular experience including key production rates;
- c) Financial means, etc;
- d) Personnel capabilities; and
- e) Equipment capabilities.

In case the Tenderer fail to fully meet any of these criteria, it may be qualified only for those lots for which the Tenderer meets the above requirement.

15. Form of Tender

- 15.1 The Tenderer shall fill the Form of Tender furnished in the Tendering Documents. The Form of Tender must be completed without any alterations to its format and no substitute shall be accepted.

16. Tender Prices

The Contract shall be for the whole Works, as described in sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Tenderer.

The Tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the Tenderer will not be paid for by the Procuring Entity when executed and shall be deemed covered by the other rates and prices in the Bill of quantities.

All duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 15 days prior to the deadline for submission of Tenders, shall be included in the rates, prices and total Tender price submitted by the Tenderer.

The rates and prices quoted by the Tenderer shall be subject to adjustment during the performance of the Contract if provided for in the Tender Data Sheet and the provisions of the Conditions of Contract. The Tenderer shall submit with the Tender all the information required under the Contract Data Sheet.

17. Tender Validity Period

Tenders shall remain valid for the period specified in the Tender Data Sheet after the Tender submission deadline prescribed by the Procuring Entity, pursuant to ITT Clause

22. A Tender valid for a shorter period shall be rejected by the Procuring Entity as non-responsive.

In exceptional circumstances, prior to expiry of the original Tender validity period, the Procuring Entity may request that the Tenderers extend the period of validity for a specified additional period. The request and the Tenderers' responses shall be made in writing or by cable. A Tenderer may refuse the request without forfeiting its Tender Security or causing to be executed its Tender Securing declaration. A Tenderer agreeing to the request will not be required or permitted to otherwise modify the Tender, but will be required to extend the validity of its Tender Security or Tender Securing declaration for the period of the extension, and in compliance with ITT Clause 19 in all respects.

In the case of fixed price contracts, if the award is delayed by a period exceeding sixty (60) days beyond the expiry of the initial Tender validity period, the contract price will be increased by a factor specified in the request for extension. The Tender evaluation shall be based on the Tender price without taking into consideration on the above correction.

18. Tender Security and Tender Securing Declaration

Pursuant to ITT Clause 12, where required in the Tender Data Sheet, the Tenderer shall furnish as part of its Tender, a Tender Security in original form and in the amount and currency specified in the Tender Data Sheet.

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

The Tender Security or Tender Securing Declaration is required to protect the Procuring Entity against the risk of Tenderer's conduct which would warrant the security's forfeiture, pursuant to ITT sub-Clause 19.9.

The Tender Security shall be denominated in the currency of the Tender and shall be in one of the following forms:

- a) Cash;
- b) A Bank Guarantee;
- c) An Insurance Bond issued by an insurance firm approved by the PPOA located in Kenya;
- d) An irrevocable letter of credit issued by a reputable bank.

The Tender Security shall be in accordance with the Form of the Tender Security included in Section X or another form approved by the Procuring Entity prior to the Tender submission.

The Tender Security shall be payable promptly upon written demand by the Procuring Entity in case any of the conditions listed in sub-Clause 19.8 are invoked.

Any Tender not accompanied by a Tender Security in accordance with sub-Clauses 19.1 or 19.3 shall be rejected by the Procuring Entity as non-responsive, pursuant to ITT Clause 28.

The Procuring Entity shall immediately release any Tender Security if:

- a) The procuring proceedings are terminated;
- b) The Procuring Entity determines that none of the submitted Tenders is responsive;
- c) A contract for the procurement is entered into.

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

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

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

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

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

19. Format and Signing of Tender

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

The original and all copies of the Tenders shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the

Tenderer. This authorization shall consist of a written confirmation as specified in the Tender Data Sheet and shall be attached to the Tender. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Tender, except for un-amended printed literature, shall be initialled by the person or persons signing the Tender.

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

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

D. Submission of Tenders

20. Sealing and Marking of Tenders

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

The inner and outer envelopes shall:

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

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

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

21. Deadline for Submission of Tenders

Tenders shall be received by the Procuring Entity at the address specified under ITT sub-Clause 21.2 no later than the date and time specified in the Tender Data Sheet.

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

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

22. Late Tenders

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

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

23. Modification, Substitution and Withdrawal of Tenders

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

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

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

Withdrawal of a Tender between the deadline for submission of Tenders and the expiration of the period of Tender validity specified in the Tender Data Sheet or as extended pursuant to sub-Clause 22.2 shall result in the forfeiture of the Tender Security and execution of Tender Securing Declaration pursuant to ITT sub-Clause 19.9.

Tenderers may only offer discounts to, or otherwise modify the prices of their Tenders by submitting Tender modifications in accordance with this Clause, or included in the original Tender submission.

E. Opening and Evaluation of Tenders

24. Opening of Tenders

The Procuring Entity will open all Tenders including modifications, substitution or withdrawal notices made pursuant to ITT Clause 24, in public, in the presence of Tenderers or their representatives who choose to attend and other parties with legitimate interest and Tender proceedings, at the place on the date and at time specified in the Tender Data Sheet. The Tenderers' representatives who are present shall sign a register as proof of their attendance.

Envelopes marked "WITHDRAWAL" shall be opened and read out first. Tenders for which an acceptable notice of withdrawal has been submitted pursuant to ITT Clause 24 shall not be opened but returned to the Tenderer. If the withdrawal envelope does not contain a copy of the "Power of Attorney" confirming the signature as a person duly authorized to sign on behalf of the Tenderer, the corresponding Tender will be opened. Subsequently, all envelopes marked "MODIFICATION" shall be opened and the submissions therein read out in appropriate detail. Thereafter all envelopes marked or "SUBSTITUTION" opened and the submissions therein read out in appropriate detail.

All other envelopes shall be opened one at a time. The Tenderers' names, the Tender prices, the total amount of each Tender and of any alternative Tender (if alternatives have been requested or permitted), any discounts, the presence or absence of Tender

security, and such other details as the appropriate tender opening committee may consider appropriate, will be announced by the Secretary of the Tender Opening Committee at the opening.

Tenders or modifications that are not opened and not read out at Tender opening shall not be considered further for evaluation, irrespective of the circumstances. In particular, any discount offered by a Tenderer which is not read out at Tender opening shall not be considered further.

Tenderers are advised to send in a representative with the knowledge of the content of the Tender who shall verify the information read out from the submitted documents. Failure to send a representative or to point out any un-read information by the sent Tenderer's representative shall indemnify the Procuring Entity against any claim or failure to read out the correct information contained in the Tenderer's Tender.

No Tender will be rejected at Tender opening except for late Tenders which will be returned unopened to the Tenderer, pursuant to ITT Clause 23.

The Secretary of the appropriate tender opening committee shall prepare minutes of the Tender opening. The record of the Tender opening shall include, as a minimum: the name of the Tenderers and whether or not there is a withdrawal, substitution or modification, the Tender price per Lot if applicable, including any discounts and alternative offers and the presence or absence of a Tender Security or Tender Securing Declaration.

The Tenderers' representatives who are present shall be requested to sign the record. The omission of a Tenderer's signature on the record shall not invalidate the contents and affect the record.

A copy of the minutes of the Tender opening shall be furnished to individual Tenderers upon request.

25. Confidentiality

Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a Contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced.

Any effort by a Tenderer to influence the Procuring Entity's processing of Tenders or award decisions may result in the rejection of his Tender.

Notwithstanding sub-Clause 26.2, from the time of Tender opening to the time of Contract award, if any Tenderer wishes to contact the Procuring Entity on any matter related to the Tendering process, it should do so in writing.

26. Clarification of Tenders

To assist in the examination, evaluation, comparison of Tenders and post-qualification of the Tenderer, the Procuring Entity may, at its discretion, ask a Tenderer for clarification of its Tender including breakdown of prices. Any clarification submitted by a Tenderer that is not in response to a request by the Procuring Entity shall not be considered.

The request for clarification and the response shall be in writing. No change in the prices or substance of the Tender shall be sought, offered, or permitted except to confirm the correction of arithmetic errors discovered by the Procuring Entity in the evaluation of Tenders in accordance with ITT Clause 29.

From the time of Tender opening to the time of Contract award if any Tenderer wishes to contact the Procuring Entity on any matter related to the Tender it should do so in writing.

27. Preliminary Examination of Tenders

Prior to the detailed evaluation of Tenders, the Procuring Entity will determine whether:

- a) The Tender has been submitted in the required format;
- b) Any Tender Security submitted is in the required form, amount and validity period;
- c) The Tender has been signed by the person lawfully authorized to do so;
- d) The required number of copies of the Tender have been submitted;
- e) The Tender is valid for the period required;
- f) All required documents and information have been submitted; and
- g) Any required samples have been submitted.

The Procuring Entity will confirm that the documents and information specified under ITT Clause 12 and ITT Clause 13 have been provided in the Tender. If any of these documents or information is missing, or is not provided in accordance with the Instructions to Tenderers, the Tender shall be rejected.

The Procuring Entity may waive any minor informality, nonconformity, or irregularity in a Tender which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Tenderer

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

- a) Affects in any substantial way the scope, quality, or execution of the Works;
- b) Limits in any substantial way, inconsistent with the Tendering documents, the Procuring Entity's rights or the Tenderer's obligations under the Contract; or

If rectified, would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders. If a Tender is not substantially responsive, it will be rejected by the Procuring Entity, and may not subsequently be made responsive by correction or withdrawal of the non- conforming deviation or reservation.

28. Correction of Errors

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

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

c) Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.

The amount stated in the Tender will, be adjusted by the Procuring Entity in accordance with the above procedure for the correction of errors and, with, the concurrence of the Tenderer, shall be considered as binding upon the Tenderer. If the Tenderer does not accept the corrected amount, its Tender will then be rejected, and the Tender Security may be forfeited and the Tender Securing Declaration may be executed in accordance with sub-Clause 19.9.

29. Conversion to Single Currency

To facilitate the evaluation and comparison, the Procuring Entity will convert all Tender prices expressed in the amounts in various currencies in which the Tender prices are payable to Kenya Shillings at the selling exchange rate established for similar transactions by the Central Bank of Kenya ruling on the date specified in the Tender Data Sheet.

30. Comparison of Tenders

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

In evaluating the Tenders, the Procuring Entity will determine for each Tender the evaluated Tender price by adjusting the Tender price as follows:

- ❖ Making any correction for errors pursuant to ITT Clause 29;
- ❖ Excluding provisional sums and the provision, if any for contingencies in the Bill of Quantities, but including Day work, where priced competitively; and
- ❖ Making appropriate adjustments to reflect discounts or other price modifications offered in accordance with sub-Clause 24.5.

The Procuring Entity may waive any minor informality or non-conformity, which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative standing of any Tenderer. Variations, deviations, and alternative offers and other factors, which are in excess of the requirements of the Tendering documents or otherwise result in unsolicited benefits for the Procuring Entity will not be taken into account in Tender evaluation.

31. National Preference

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

- a) The funding is 100% from the Government of Kenya or a Kenyan body;
- b) The amounts are below the prescribed threshold of KShs.200 million;

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

- a) Proving Kenyan citizenship by production of a Kenyan Identity Card; or
- b) Providing proof of being a “citizen contractor” in terms of section 3(1) of the Act, i.e. being a natural person or an incorporated company wholly owned and controlled by persons who are citizens of Kenya.

The Minister of Finance may prescribe additional preference and/or reservation schemes, for example for procurements above these thresholds. If such additional preference schemes apply, details will be given in the Tender Data Sheet.

32. Determination of the Lowest Evaluated Tender

- 33.1 The Tender with the lowest evaluated price from among those which are eligible, compliant and substantially responsive shall be the lowest evaluated Tender.

33. Post-qualification of Tenderer

If specified in the Tender Data Sheet, post-qualification shall be undertaken.

The Procuring Entity will determine to its satisfaction whether the Tenderer that is selected as having submitted the lowest evaluated responsive Tender is qualified to perform the contract satisfactorily, in accordance with the criteria listed in sub-Clause 13.3.

The determination will take into account the Tenderer's financial, technical, and production capabilities. It will be based upon an examination of the documentary evidence of the Tenderer's qualifications submitted by the Tenderer, pursuant to sub-Clause 13.3, as well as such other information as the Procuring Entity deems necessary and appropriate. Factors not included in these Tendering documents shall not be used in the evaluation of the Tenderer's qualifications.

An affirmative determination will be a prerequisite for award of the contract to the Tenderer. A negative determination will result in rejection of the Tenderer's Tender, in which event the Procuring Entity will proceed to the next lowest evaluated Tender to make a similar determination of that Tenderer's capabilities to perform satisfactorily.

F. Award of Contract

34. Criteria of Award

Subject to ITT Clause 35 and 36, the Procuring Entity will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tendering documents and who has offered the lowest Evaluated Tender Price, provided that such Tenderer has been determined to be:

- a) Eligible in accordance with the provisions of ITT Clause 3;
- b) Is determined to be qualified to perform the Contract satisfactorily;

- c) Successful negotiations have been concluded.

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

35. Clarifications

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

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

Clarifications shall not change the substance of the tender.

36. Procuring Entity’s Right to accept any tender and to reject any or all Tenders

Notwithstanding ITT Clause 35, the Procuring Entity reserves the right to accept or reject any tender, and to cancel the Tendering process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers.

Notice of the rejection of all Tenders shall be given promptly within 14 days to all Contractors that have submitted Tenders.

The Procuring Entity shall upon request communicate to any Tenderer the grounds for its rejection of its Tenders, but is not required to justify those grounds.

37. Procuring Entities Right to Vary Quantities at the Time of Award

- 38.1 The Procuring Entity reserves the right at the time of contract award to increase or decrease the quantity of goods or related services originally specified in these Tendering documents (schedule of requirements) provided this does not exceed by the percentage indicated in the Tender Data Sheet, without any change in unit price or other terms and conditions of the Tender and Tendering documents.

38. Notification of Award

The Tenderer whose Tender has been accepted will be notified of the award by the Procuring Entity prior to expiration of the Tender validity period by e-mail or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Procuring Entity will pay the Contractor in consideration of the provision and maintenance of the Work(s) as pre-scribed by the Contract (hereinafter and in the Contract called the "Contract Price").

The notification of award will constitute the formation of the Contract, subject to the tenderer furnishing the Performance Security in accordance with ITT Clause 41 and signing the Contract in accordance with sub-Clause 40.2

At the same time as the person submitting the successful Tender is notified, the Procuring Entity will notify each unsuccessful Tenderer, the name of the successful Tenderer and the Contract amount and will discharge the Tender Security and Tender Securing Declaration of the Tenderer pursuant to ITT sub Clause 19.7.

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

39. Signing of Contract

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

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

40. Performance Security

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

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

- a) At the Tenderer's option, by a bank or insurance firm located in Kenya, or a foreign bank or insurance firm through a correspondent bank or insurance firm located in Kenya;
- b) With the consent of the Procuring entity, directly by a foreign bank acceptable to the Procuring entity.

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

41. Advance Payment

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

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

42. Adjudicator

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

G. Review of Procurement Decisions

43. Right to Review

A Tenderer who claims to have suffered or risk suffering, loss or damage or injury as a result of breach of a duty imposed on a Procuring Entity or an Approving Authority by the Public Procurement and Assets Disposal Act, 2015 and the Public Procurement and Disposal Regulations 2006, the procurement proceedings or processes, may seek administrative review as prescribed by the Act. The following matters, however, shall not be subject to the administrative review:

- a) The choice of procurement method;
- b) A decision by the Procuring Entity to reject all Tenders, proposals or quotations;
- c) Where a contract is signed in accordance to the Public Procurement and Assets Disposal Act, 2015;
- d) Where an appeal is frivolous.

44. Time Limit on Review

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

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

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

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

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

46. Decision by the Public Procurement Administrative Review Board

The Administrative Review Board shall within thirty days after receipt of an application for administrative review deliver a written decision which shall indicate:

- a) Annuling anything the Procuring Entity has done in the procurement proceedings, including annulling the procurement proceedings in their entirety;
- b) Giving directions to the Procuring Entity with respect to anything to be done or redone in the procurement proceedings;
- c) Substituting the decision of the Review Board for any decision of the Procuring Entity in the procurement proceedings;
- d) Order the payment of costs as between parties to the review.

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

47. Appeal on the decision of the Review Board

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

SECTION III: TENDER DATASHEET

Tender Data Sheet (TDS)

Instructions to Tenderers Clause Reference

TDS Reference Number	ITT Clause Number	Amendments of, and Supplements to, Clauses in the Instruction to Tenderers
A. Introduction		
1.	1.1	The Procuring Entity is Murang'a South Water & Sanitation Company Ltd.
2.	1.1	Name of Project is Upscaling Basic Sanitation for Urban Poor (UBSUP): Construction of a decentralised Treatment Facility of 50m ³ /day treatment capacity
3.	1.2	The expected completion date of the works is 4 months from the commencement date
4.	1.3	The overall goal is the improvement of the living standard of inhabitants from low income areas in Kenya. The specific objective of the Project is a fully complying treatment of collected sewer from septic tanks and toilets from low income areas.
5.	2.1	Name of financing institution is The Water Sector Trust Fund Name of the Procuring is Murang'a South Water and Sanitation Company Ltd Financial Year: 2019/20 Describe works under the contracts: Construction of <ul style="list-style-type: none"> (a) 1 No. of Receiving Bay with Balancing Tank (RBBT) (b) 1 No. of Settler (ST) (c) 1 No. of Anaerobic Baffled Reactor (ABR) (d) 2 No. of Vertical Flow Constructed Wetland (VFCW) (e) 1 No. of Sludge Drying Bed (SDB) (f) 1 No. of Incinerator (g) 1 No. of Operator House (OH) (h) Auxiliary works , such as Fencing, Gates, chambers
6.	2.2	The loan/ credit number is ...NA.....
7.	5.1	Alternative Tenders are not allowed in this Tender.
8.	5.2	Alternative time for completion : not applicable
9.	3.1	Contractors registered with the ministry of public works and additionally with the ministry of water and irrigation can apply for this tender This Tender is exclusively reserved for national contractors.

		(NCA 7 and above - water works with a valid NCA license/permits)
10.	7.3	Pre-Tender meeting will take place at MUSWASCO'S Office, in Kandara and thereafter proceed to the site on Thursday 26 th November, 2019, 9:00am
11.	7.5	The minutes of the pre-Tender meeting will be transmitted with- in 7 working days
	7.6	Non-attendance at the pre-tender meeting will result in disqualification. The signed attendance Register will be an added value for the tenderer during Evaluation.

B. Tendering Documents		
12.	8.2	The number of copies to be completed and returned with the Tender is 1 copy and 1No. Original copy and well-marked.
13.	8.1	Address for clarification of Tendering Document is murangasouth@gmail.com
14.	8.2	Period to Respond to request for clarification by the Procuring Entity <i>2 weeks prior the date of tender opening</i>

C. Preparation of Tenders		
15.	11.1	Language of Tender and all correspondence shall be English
16.	13.3	<p>The Tenderer shall include the following information and documents with his tender:</p> <ul style="list-style-type: none"> a) Registration with NCA (National Construction Authority) b) copies of certificates of registration, and principal place of business; c) Total monetary value of construction work performed for each of the last five years; d) Tender security of 2% of the tender sum from a reputable financial institution or in form of a banker's cheque. e) Experience in works of a similar nature and size as the prime contractor for each of the last five years, and clients who may be contacted for further information on these contracts; f) Major items of construction equipment owned; g) Qualifications and experience of key site management and technical personnel proposed for the Contract (minimum of 6 years required in works of an equivalent nature and volume). An employment contract should be provided which covers the duration of the project, h) Authority to seek references from the Tenderer's bankers. i) Certified Audited accounts for the last 3 years j) Tenderers are required to attach copies of the, TAX Compliance Certificate, PIN and VAT certificates from Income Tax and Value Added Tax Departments, current Single Business Permit and receipt as proof of purchase of the Tender Document.

		k) Original letter of invitation to Tender and original payment receipt of Tender document.
		<p>l) Any additional documents/ evidence of adequate working capital for this contract.</p> <p>The essential equipment to be made available for the Contract by the successful Tenderer (proposals for timely acquisition or own, lease, hire, etc) shall be:</p> <p>a) 1 No. of lorry for transport of material (hired or owned) b) 1 No. of pick-up (owned) c) 1 No. of mobile concrete mixer (owned) d) 1 No. of vibrator (owned) e) 1 No. of level machine (owned)</p> <p>Please provide evidence</p>
17.	13.4	In the case of joint venture each partner shall submit information required under Clause ITT Clause 13.4.
18.	16.4	The price shall be fixed Information to be submitted with the Tender are: (state if any).
19.	17.1	The currency in which the prices shall be quoted shall be: Kenyan Shilling
20.	17.2 30.2	<p>The authority for establishing the rates of exchange shall be Central Bank of Kenya.</p> <p>The applicable date for exchange rates for tendering and evaluation purposes is 28 days earlier than the final deadline for the submission of tenders.</p>
21.	18.1	The Tender validity period shall be 120 days.
22.	19.1	The amount of Tender Security shall be 2 % of the Tender amount
23.	20.1	In addition to the original of the Tender, the Tenderer should submit 1 copy and 1 original of the Tender

D. Submission of Tenders		
25.	21.2 a)	Tenders shall be submitted to Murang'a South Water & Sanitation Company Ltd, P.O. Box 87-01034 Kandara.

26.	21.2 b)	Project name: Construction of Decentralised Treatment Facility (DTF) in sabasaba Tender number: MUSWASCO/NCB/TENDER/NOV-19/20(2)
27.	22.1	The deadline for Tender submission is Thursday 13 th DECEMBER, 2019, 10:30 am
28	24.4	Expiry of Tender validity is 120 days.

E. Opening and Evaluation of Tenders

29.	25.1	<p>The Tender opening shall take place at: Murang'a South Water and Sanitation Co. Ltd, P.O Box 87-01034 Kandara Country : Kenya</p> <p>Date: 13th December, 2019</p> <p>Time. 10:30am</p>
30.	32.3	<p>Additional Preference NA</p>
31.	34.1	<p>Post- qualification will not be undertaken</p>
32.	38.1	<p>Percentage for quantities increase or decrease is (10percent) [This should not exceed 15 percent]</p>

F. Award of Contract

33.	41.1	The amount of Performance Security shall be 10%
34.	42.1	The Advance Payment shall be none
35.	43.1	The proposed adjudicator for the project is: [insert name of the proposed adjudicator] whose hourly rate shall be [insert proposed hourly rate].

G. Review of Procurement Decisions

37.	46.1	<p>The address for submitting appeals to Administrative Review Board :</p> <p>The Secretary, Public Procurement Administrative Review Board , The Public Procurement Oversight Authority, 10th Floor ,National Bank House, P.O. Box 58583-00200, NAIROBI, Kenya. Tel: +254 (0) 20 3244000 Email: info@ppoa.go.ke Website: www.ppoa.go.ke</p>
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SECTION IV: GENERAL CONDITIONS OF CONTRACT

A. General

1. Definitions

1.1 Boldface type is used to identify defined terms.

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

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

Compensation Events are those defined in Clause 47 hereunder.

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

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

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

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

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

Days are calendar days; months are calendar months.

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

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

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

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

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

The Procuring Entity is the party who employs the Contractor to carry out the Works. Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

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

The Intended Completion Date is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data Sheet. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.

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

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

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

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

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

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

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

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

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

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

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

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

2. Interpretation

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

If sectional completion is specified in the Contract Data Sheet, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

The documents forming the Contract shall be interpreted in the order of priority given in the Contract Data Sheet:

- (1) Agreement;
- (2) Letter of Acceptance;
- (3) Contract Data Sheet;
- (4) Conditions of Contract;

- (5) Technical Specifications;
- (6) Contractor's Form of Tender;
- (7) Drawings;
- (8) Bill of Quantities; and
- (9) Any other document listed in the Contract Data Sheet as forming part of the Contract.

3. Language, Law, Fraud and Corruption

The language of the Contract and the law governing the Contract are stated in the Contract Data Sheet.

The Government requires that Procuring Entities (including beneficiaries of Government funded projects) as well as Tenderers/Suppliers/Contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. It is the responsibility of the Procuring Entity to ensure that Tenderers, suppliers, and contractors and their subcontractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy:

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

- (i) "Corruption" has the meaning assigned to it in the Anti Corruption and Economic Crime Act 2003 and includes the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement or disposal process or in contract execution;
- (ii) "Fraudulent Practice" includes a misrepresentation of fact in order to influence a procurement or disposal process or the execution of a contract to the detriment of the Procuring Entity and includes collusive practices amongst Tenderers prior to or after Tender submission designed to establish Tender prices at artificial non competitive levels and deprive the Procuring Entity of the benefits of free and open competition;
- (iii) "Collusive Practice" means an arrangement between two or more suppliers, contractors and subcontractors designed to achieve an improper purpose, including to influence improperly the actions of the Procuring Entity prior to or after Tender submission, designed to establish Tender prices at artificial non competitive levels and to deprive the Procuring Entity of the benefit of free and open competition;
- (iv) "Coercive Practice" means impairing or harming, or threatening to impair or harm, directly or indirectly a supplier, contractor or subcontractor or the property of any of them to influence improperly the actions of a Procuring Entity;
- (v) "Obstructive Practice" means deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede an investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and /or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation.
- (vi) A Procuring Entity has the right to require that Tenderers, suppliers, and contractors and their subcontractors permit persons duly appointed by KACC/PPOA/KNAO to inspect their accounts and records and other documents relating to the Tender submission and contract performance;

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

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

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

The Director-General may, on the advice of the Advisory Board, debar a person from participating in procurement proceedings on the ground that the person has committed an offence under the Public Procurement and Assets Disposal Act, 2015. A debarment shall be for a period of time of not less than five years. Before a person is so debarred, he/she will be given an opportunity to make representations to the Director-General and may request the Review Board to review the debarment.

Any communication between the Tenderers and the Procuring Entity related to matters of alleged fraud or corruption must be made in writing.

4. Confidentiality

- 4.1 The Service Providers, their Subcontractors, and the Personnel of either of them shall not disclose any proprietary or confidential information relating to the Project, the Services, this Contract, or the Procuring Entity's business or operations without the prior written consent of the Procuring Entity.

5. Project Manager's Decisions

- 5.1 Except where otherwise specifically stated, the Project Manager will decide contractual matters between the Procuring Entity and the Contractor in the role representing the Procuring Entity.

6. Delegation

- 6.1 The Project Manager may delegate any of his duties and responsibilities to other people except to the Adjudicator, after notifying the Contractor, and may cancel any delegation after notifying the Contractor.

7. Communications

- 7.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.

8. Subcontracting

- 8.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Procuring Entity in writing. Subcontracting shall not alter the Contractor's obligations.

9. Other Contractors

- 9.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Procuring Entity between the dates given in the Schedule of Other Contractors, as referred to in the Contract Data Sheet. The Contractor shall also provide facilities and services for them as described in the Schedule. The Procuring Entity may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification

10. Personnel

The Contractor shall employ the key personnel named in the Schedule of Key Personnel, as referred to in the Contract Data Sheet, who shall be appropriately

qualified and registered with the appropriate bodies to carry out the functions stated in the Schedule or other personnel approved by the Project Manager. The Project Manager will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Schedule.

If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

11. Procuring Entity's and Contractor's Risks

- 11.1 The Procuring Entity carries the risks which this Contract states are Procuring Entity's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

12. Procuring Entity's Risks

From the Start Date until the Defects Correction Certificate has been issued, the following are Procuring Entity's risks:

- a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to:
 - i. Use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works; or
 - ii. Negligence, breach of statutory duty, or interference with any legal right by the Procuring Entity or by any person employed by or contracted to him except the Contractor.
- b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Procuring Entity or in the Procuring Entity's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

From the Completion Date until the Defects Correction Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Procuring Entity's risk except loss or damage due to:

- a) A Defect which existed on the Completion Date;
- b) An event occurring before the Completion Date, which was not itself an Procuring Entity's risk; or
- c) The activities of the Contractor on the Site after the Completion Date.

13. Contractor's Risks

- 13.1 From the Starting Date until the Defects Correction Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Procuring Entity's risks are Contractor's risks.

14. Insurance

The Contractor shall provide, in the joint names of the Procuring Entity and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract Data Sheet for the following events which are due to the Contractor's risks:

- (a) Loss of or damage to the Works, Plant, and Materials;
- (b) Loss of or damage to Equipment;
- (c) Loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and
- (d) Personal injury or death.

Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

If the Contractor does not provide any of the policies and certificates required, the Procuring Entity may affect the insurance which the Contractor should have provided and recover the premiums the Procuring Entity has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

Alterations to the terms of insurance shall not be made without the approval of the Project Manager.

Both parties shall comply with any conditions of the insurance policies.

15. Site Investigation Reports

- 15.1 The Contractor, in preparing the Tender, shall rely on any Site Investigation Reports referred to in the Contract Data Sheet, supplemented by any information available to the Tenderers.

16. Queries about the Contract Data Sheet

- 16.1 The Project Manager will clarify queries on the Contract Data Sheet.

17. Contractor to Construct the Works

- 17.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.

18. Commencement and Completion

- 18.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Programme submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.

19. Approval by the Project Manager

The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, who is to approve them if they comply with the Specifications and Drawings.

The Contractor shall be responsible for the design of Temporary Works.

The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.

All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before their use.

20. Protection of the Environment

The Contractors shall take all reasonable steps to protect the environment and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.

The Contractors shall ensure that emissions, surface discharges and effluent from his activities shall not exceed prescribed values in the environmental laws.

21. Labour Laws

The Contractor shall comply with all the relevant labour laws applicable in the Country, including laws relating to workers employment, working hours, health, safety, welfare, and immigration, and shall allow them all their legal rights.

The Contractor shall require his employees to obey all applicable laws, including those concerning safety at work.

22. Health and Safety

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of his personnel.

The Contractor shall ensure that first aid facilities are available at all times at the site and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

The Contractor shall notify the Procuring Entity details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety, and welfare of persons, and damage to the property, as the Procuring Entity may reasonably require.

The Contractor shall conduct an HIV-Aids awareness programme, and shall take other such measures as specified in the Contract Data Sheet to reduce the risk of transfer of HIV virus between and among Contractor personnel, the Procuring Entity's Staff and the surrounding community.

23. Discoveries

- 23.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Procuring Entity. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.

24. Possession of the Site

- 24.1 The Procuring Entity shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data Sheet, the Procuring Entity will be deemed to have delayed the start of the relevant activities, and this will be a Compensation Event.

25. Access to the Site

- 25.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

26. Instructions, Inspections and Audits

The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.

The Contractor shall permit the Kenya Government to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Kenya Government, if so required by the Kenya Government

27. Disputes

- 27.1 If the Contractor believes that a decision taken by the Project Manager was either outside the authority given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Project Manager's decision.

28. Procedure for Disputes

The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.

The Adjudicator shall be paid by the hour at the rate specified in the Tender Data Sheet and Contract Data Sheet, together with reimbursable expenses of the types specified in the Contract Data Sheet, and the cost shall be divided equally between the Procuring Entity and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision will be final and binding.

The arbitration shall be conducted in accordance with the arbitration procedure published by the institution named and in the place shown in the Contract Data Sheet.

29. Replacement of Adjudicator

- 29.1 Should the Adjudicator resign or die, or should the Procuring Entity and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator will be jointly appointed by the Procuring Entity and the Contractor. In case of disagreement between the Procuring Entity and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority designated in the Contract Data Sheet at the request of either party, within 14 days of receipt of such request.

B. Time Control

30. Programme

Within the time stated in the Contract Data Sheet, the Contractor shall submit to the Project Manager for approval a Programme showing the general methods, arrangements, order, and timing for all the activities in the Works.

An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.

The Contractor shall submit to the Project Manager for approval an updated Programme at intervals no longer than the period stated in the Contract Data Sheet. If the Contractor does not submit an updated Programme within this period, the Project Manager may withhold the amount stated in the Contract Data Sheet from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted.

The Project Manager's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Project Manager again at any time. A revised Programme shall show the effect of Variations and Compensation Events

31. Extension of the Intended Completion Date

The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.

The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

32. Acceleration

When the Procuring Entity wants the Contractor to finish before the Intended Completion Date, the Project Manager will obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Procuring Entity accepts these proposals, the Intended Completion Date will be adjusted accordingly and confirmed by both the Procuring Entity and the Contractor.

If the Contractor's priced proposals for acceleration are accepted by the Procuring Entity, they shall be incorporated in the Contract Price and treated as a Variation.

33. Delays Ordered by the Project Manager

- 33.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.

34. Management Meetings

Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Procuring Entity. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

35. Early Warning

The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.

The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

C. Quality Control

36. Identifying Defects

- 36.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.

37. Tests

- 37.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.

38. Correction of Defects

The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the Contract Data Sheet. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.

If the Contractor has not corrected a defect within the time specified in the Procuring Entity's notice, a penalty for lack of performance will be paid by the Contractor. The amount to be paid will be calculated as a percentage of the cost of having the defect correct, assessed as described in Clause 39.

39. Uncorrected Defects

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

D. Cost Control

40. Bill of Quantities

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

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

41. Changes in the Quantities

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

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

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

42. Variations

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

43. Payments for Variations

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

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

If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.

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

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

44. Cash Flow Forecasts

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

45. Payment Certificates

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

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

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

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

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

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

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

46. Payments

Payments shall be adjusted for deductions for advance payments and retention. The Procuring Entity shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of each certificate. If the Procuring Entity makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made as indicated in the Contract Data Sheet..

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

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

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

47. Compensation Events

The following shall be Compensation Events:

- a) The Procuring Entity does not give access to a part of the Site by the Site Possession Date stated in the Contract Data Sheet.
- b) The Procuring Entity modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.
- c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.
- d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.
- e) The Project Manager unreasonably does not approve a subcontract to be let.
- f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to Tenderers (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.
- g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Procuring Entity, or additional work required for safety or other reasons.
- h) Other contractors, public authorities, utilities, or the Procuring Entity does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.
- i) The advance payment is delayed.
- j) The effects on the Contractor of any of the Procuring Entity's Risks.
- k) The Project Manager unreasonably delays issuing a Certificate of Completion.

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

If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager will assume that the Contractor will react competently and promptly to the event.

The Contractor shall not be entitled to compensation to the extent that the Procuring Entity's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.

48. Taxes

- 48.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days before the submission of Tenders for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of Clause 50.

49. Currencies

- 49.1 Where payments are made in currencies other than the Kenya Shillings, the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Tender.

50. Price Adjustment

The amounts payable to the Contractor, in various currencies pursuant to Sub-Clause 45.1, shall be adjusted in respect of the rise or fall in the cost of labour, Contractor's Equipment, Plant, materials, and other inputs to the Works, by applying to such amounts the formulae prescribed in this clause based on the prevailing consumer price

index obtained from the Central Bureau of Statistics or the monthly inflation rate issued by the Central Bank of Kenya.

To the extent that full compensation for any rise or fall in costs to the Contractor is not covered by the provisions of this or other clauses in the Contract, the unit rates and prices included in the Contract shall be deemed to include amounts to cover the contingency of such other rise or fall of costs.

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

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

where;

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

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

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

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

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

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

$$F = P_n \times P_c$$

where;

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

(i) the amount which, in the opinion of the Project Manager, is due to the Contractor under Clause 45 (before deduction of retention money and before deducting sums previously paid on account) less:

- any amount for payment or repayment of any advance payment;
- any amount for materials on site (if any);
- any amounts for nominated sub-contractors (if any)
- any amounts for any other items based on actual cost or current prices; or
- any sums for increase or decreases in the Contract Price paid under this Sub-Clause and

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

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

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

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

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

51. Retention

The Procuring Entity shall retain from each payment due to the Contractor the proportion stated in the Contract Data Sheet until Completion of the whole of the Works.

On completion of the whole of the Works, half the total amount retained shall be repaid to the Contractor and the other half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected.

On completion of the whole Works, the Contractor may substitute retention money with an “on demand” Bank guarantee.

52. Liquidated Damages

The Contractor shall pay liquidated damages to the Procuring Entity at the rate per day stated in the Contract Data Sheet for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the Contract Data Sheet. The Procuring Entity may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor’s liabilities.

If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest

on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in Sub-Clause 46.1.

If the Contractor has not corrected a defects within the time specified in the Procuring Entity's notice, the Procuring Entity will assess the cost of having the defect corrected, the Contractor will pay this amount, and a penalty for lack of performance calculated as described in Clause 38.

53. Bonus

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

54. Advance Payment

The Procuring Entity shall make advance payment to the Contractor of the amounts stated in the Contract Data Sheet by the date stated in the Contract Data Sheet, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Procuring Entity in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest will not be charged on the advance payment.

The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.

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

55. Performance Security

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

56. Dayworks

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

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

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

57. Cost of Repairs

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

E. Finishing the Contract

58. Completion Certificate

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

59. Taking Over

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

60. Final Account

- 60.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been re-submitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.

61. Operating and Maintenance Manuals

If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data Sheet.

If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract Data Sheet, or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount stated in the Contract Data Sheet from payments due to the Contractor.

62. Termination

The Procuring Entity or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

Fundamental breaches of Contract shall include, but shall not be limited to, the following:

- a) The Contractor stops work for 28 days when no stoppage of work is shown on the current Programme and the stoppage has not been authorized by the Project Manager;
- b) The Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;
- c) The Procuring Entity or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- d) A payment certified by the Project Manager is not paid by the Procuring Entity to the Contractor within 84 days of the date of the Project Manager's certificate;

- e) The Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;
- f) The Contractor does not maintain a Security, which is required; and
- g) The Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the Contract Data Sheet.
- h) If the Contractor, in the judgment of the Procuring Entity has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this paragraph:

“corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution and includes inter alia, bribery and extortion or coercion which involves threats of injury to person ,property or reputation, and.

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

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

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

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

63. Payment upon Termination

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

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

64. Property

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

65. Release from Performance

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

out afterwards to which a commitment was made.

66. Suspension of Financing

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

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

SECTION V: CONTRACT DATA SHEET (CDS)

Contract Data Sheet

Instructions for completing the Contract Data Sheet

CDS Clause	GCC Clause	Description
1	1.1	<p>A. General</p> <p>(Itemise Definitions to take the same numbering as per the General Conditions)</p> <p>The Procuring Entity is [<i>(WSP)Name, address, and name of authorized representative</i>].</p> <p>The Defects Liability Period is 180 days.</p> <p>The Project Manager is <i>Technical Services Manager, Murang'a Southof P.O Box 87-01034 Kandara,</i>.</p> <p>The name and identification number of the Contract is Tender Reference No. MUSWASCO/NCB/TENDER/NOV -19/20(2)</p> <p>Tender Name. Proposed Construction of Decentralized Treatment Facility (DTF) in Sabasaba Town- Muranga County</p> <p>The Works consist of</p> <ul style="list-style-type: none"> (a) 1 No. of Receiving Bay with Balancing Tank (RBBT) (b) 1 No. of Settler (ST) (c) 1 No. of Anaerobic Baffled Reactor (ABR) (d) 2 No. of Vertical Flow Constructed Wetland (VFCW) (e) 1 No. of Sludge Drying Bed (SDB) (f) 1 No. of Incinerator (g) 1 No. of Operator House (OH) (h) Auxiliary works , such as Fencing, Gates, chambers <p>The objectives of the contract are</p> <p><i>[functional objectives of the works]</i></p> <p>which are mandatory requirements that override any detail which may be provided below.</p> <p>The Start Date shall be <i>[insert date]</i>.</p> <p>The Intended Completion Date for the whole of the Works shall be <i>[insert date - (Date to be 4 months from the commencement date)]</i>.</p> <p>The Site is located in SABASABA Town</p>

2.	2.2	Indicate whether there is sectional completion: No sectional Completion
3.	2.3(9)	List other documents that form part of the contract if any: 1) Notification of award 2) Letter of Acceptance; 3) Agreement; 4) Any other document listed in the Contract Data Sheet as forming part of the Contract
4.	3.1	The language of the Contract documents is English.
		The law that applies to the Contract is the Kenyan Law.
	5	Project Managers Decision: The Project Manager shall be the Employer's representative All decisions made by the Project Manager of the WSP have to be documented in the instruction book for final approval through the WSTF
	8	The Contractor may sub-contract the Works but only to a maximum of 25% of the contract price.
5.	9.1	Include the Schedule of Other Contractors/suppliers, if any. <i>[give list of other contractors]</i>
6.	10.1	Include the Schedule of Key Personnel. <i>[Give list of key personnel]</i>
7.	14.1	The minimum insurance covers shall be: (a) loss of or damage to the Works, Plant, and Materials (b) loss of or damage to Equipment (c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract and (d) Personal injury or death
8.	15.1	Site Investigation Reports available to the successful Tenderer are: a) Environmental Impact Report (EIA). c) Copy of Title Deed or a legal transfer letter OR AUTHORITY of the County Government that the land has been issued to the WSP for the intended purpose.
10.	24.1 & 47.1	The Site Possession Date shall be <i>[insert date]</i> .
11.	28.2	Hourly rate of Fees payable to the Adjudicator is: <i>[insert hourly fee in KShs..]</i> Types of reimbursable expenses to be paid to the Adjudicator include: [insert types of reimbursable expenses]. a)..... b)..... c).....
12.	28.3	Arbitration will take place at <i>[insert the place]</i> in accordance with rules and regulations published by <i>[state the institutions] and [insert rules and regulations]</i>
13.	29.1	Appointing Authority for the Adjudicator: Arbitration Society of Kenya whose hourly rate shall be Two Thousand shillings

		(2000.00)
B. Time Control		
14.	30.1	<p>The principal work plan - provided by the WSP in this Tender Document - is mandatory for the Tenderer.</p> <p>The successful Tenderer shall - based on the principal work plan - submit a detailed Programme for the Works within <i>[indicate number]</i> days of delivery of the Letter of Acceptance.</p>
15.	30.3	The period between Programme updates is Monthly
16.	30.3	<p>The amount to be withheld by the Project Manager in the case the contractor does not submit an updated programme is:</p> <p>Kshs 1000/day</p>
C. Quality Control		
17.	38.1	<p>The Defects Liability Period is</p> <p>180 days</p>
	38.2	The Project Manager is allowed to specify in his notice to the contractor the time period for the correction of a defect to be between 7 to 14 days .
	40.2	The calculated quantity of Works completed by the contractor have to be indicated in the work measurement certificate, including position and the actual price rate per item from the Bill of Quantities filled in by the contractor.
18.	42	<p>This is a fixed contract; therefore no variations shall apply. However, variations may apply to the project if unforeseen events make changes necessary. In this scenario the procedure shall be:</p> <ul style="list-style-type: none"> (a) Any variation shall be documented in the general WSTF Instruction book by the Project Manager (b) In agreement with the Project Manager the Contractor shall fill the variation order form (see SECTION XII) and forward to the Project Manager for further action. (c) The Project Manager shall review the variation order which shall be given within seven (7) days and inform the County Resident Monitor about the variation(s). (d) Afterwards the variation shall be reviewed by the respective WSP Tender Committee before being submitted to WSTF for final consideration.

18.	45.7	Minimum percentage for an Interim Payment Certificate will be 30%
20.	47.1(a)	The Site Possession Date shall be insert date]. [
21.	50	The contract is not subject to price adjustment in accordance with Clause 50 of the General Conditions of Contract.
22.	51.1	The amount of retention is 10% of value of works of Interim Payment Certificate.
	52.2	The amount of retention shall be retained until the Defects Liability Period has ended and the Project Manager has certified in the Taking Over Certificate that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected
23.	52.1 62.2 (g)	The rate of liquidated damages is 10%
25.	54.1	Advance Payment: Not applicable
26.	55.1	The Bid bond (Tender Security) shall be 2%
27.	61.1	As built drawings shall be supplied by the contractor Immediately after the defect liability period has started. The Taking Over Certificate will be only issued to the contractor if the as built drawings have been handed over to the Employer Operating manual shall be supplied by WSTF
28.	61.2	The amount to be withheld by the Project Manager in the case the contractor does not submit as built drawings is 2.5% from the contract amount

SECTION VI: TECHNICAL SPECIFICATIONS

1. GENERAL

All materials, equipment and testing apparatus etc. to be furnished and Works to be executed by the Contractor in this Contract shall conform to the requirements of the latest Kenya Standards, International Standards Organization (ISO) Standards, DIN, British Standards or other approved applicable Standard in Kenya, unless otherwise specifically stated.

Equipment to be purchased shall be from well recognized manufacturers whose products are standardized and controlled by any recognized Standards Organization.

All dimensions and measurement units shall be in S.I. units.

Equipment

The equipment to be employed by the Contractor shall have sufficient performance capacity and durability as to secure the completion of the Works within the construction period stipulated under the Contract. All materials and equipment shall be subject to inspections or tests by the Employer's representative at any time and in any state of completion both off-site and on-site as he deems necessary.

Temporary site store

For all equipment the contractor shall also plan for a temporary site store which is sup- posed to be removed from the site after completion of the works.

Survey Equipment

Listed below are the principal items of survey equipment to be made available for use during the whole duration of Project Implementation. All equipment shall be as new and with all necessary carrying containers, manuals, insurances, etc.

<u>Equipment</u>	
Precise automatic levels including tripods (Wild or similar)	1 Nr
Metric extending levelling staffs with vertical bubble	1 Nr
30m (enamelled or otherwise protected) steel bands	1 Nr
5 metre steel tapes	2 Nr
Builders spirit levels 1000mm long	1 Nr

Supply of pegs, crayons, spray paint, nails and all other items required for setting out and measuring the work.

The cost for provision of the above is deemed to be covered in the Bidder's Rates.

Protection of works

The Contractor shall carefully protect from injury by weather all work and materials which may be affected thereby.

Survey Beacons

During the progress of the Works, the Contractor shall not remove, damage, alter or de- stroy in any way whatsoever, any plot or survey beacons. He shall notify the Employer's representative of the need to interfere with any beacon. Employer's representative shall authorize any removal and reinstatement that he considers necessary.

Should any beacon be damaged or destroyed, the Contractor shall forthwith report the damage to the Employer's representative and to the Director of Surveys and shall be held liable for the cost of reinstatement thereof.

Damage to land

Except where specified for the proper execution of the Works, the Contractor shall not interfere with any fence, hedge, tree, land or crops within, upon or forming the boundary of the site or elsewhere. In the event of such interference, the Contractor shall make good to the satisfaction of the owner and the Employer's representative and shall pay to the owner such damages as the Employer's representative may determine.

Rivers and Drains

The Contractor shall at all times maintain the free flow of rivers and drains and prevent excavated material from the Works from being deposited in them.

Temporary works

The Contractor shall provide, maintain and remove on completion of the Works all temporary Works including roadways, sleeper tracks and staging etc., over roads, footpaths, suitable in every respect to carry all plant required for the work or for providing access or for any other purpose.

Details of Temporary Works shall be submitted in advance to the Employer's representative for his approval and the approval shall not relieve the Contractor of complete responsibility for their safety and satisfactory operation.

Signing

An advance warning sign in advance of the obstruction will be required, and where an appreciable change of direction is necessary at the obstruction, a sign (of the arrow or chevron type) at the obstruction itself. At particular danger points more comprehensive signing may be required.

Footpaths

Where a footpath is affected by an obstruction in any way it shall be separated from both obstruction and traffic by effective banners and red marked signs spaced at regular intervals as instructed by the Employer's representative

Affected Services

Public owned services.

Before commencing Works which include excavation or ground levelling by manual or mechanical excavation the Contractor shall ensure that any services of

- (a) The regional Water and Sewerage Company
- (b) Telkom Kenya,
- (c) Kenya Power & Lighting Co. Ltd.
- (d) and all other Public Bodies, Companies and persons who may be affected,

have been located with position and depth of their respective ducts, cables, mains, pipes, or other appurtenances.

The Contractor shall then at his own expense arrange the protection of those services during his works.

The Contractor shall be liable for the cost of relocation or repairs to any services damaged as a result of carrying out the Works and execution of these Works.

Privately owned services

If any privately owned or public services passing through the site will be affected by the Works, the Contractor shall provide at his own expense a satisfactory alternative service in full working order to the satisfaction of the owner of the services and the Employer's representative before the cutting of the existing service. Any damage to private or public services shall be made good by the Contractor at his cost.

Water Supply

The Contractor shall provide for all purposes of the work, an adequate supply of water from a suitable source or sources approved by the Employer's representative. He must pay the water charges, if any, and make arrangements for supply, transport and distribution.

Use of heavy plant

In the event of the Contractor desiring to use heavy machinery or plant, he shall first satisfy the Employer's representative that they will be of such size and used in such a manner as not to cause any disturbance or damage in particular to water, electricity, fences, roads or other mains, cables and connections or to sewers, culverts etc. or interfere with the line or position of any overhead wires and cables of any sort, telegraph poles, power poles etc.

The Contractor will be held liable for any such damage or disturbance and shall pay the full costs of any reinstatement, relaying, repairing or refixing as may be required, as agreed between the Employer's representative and the owner affected.

Provision of instruments and labour

The Contractor shall provide at his own expenses all instruments, materials, tools and other things which the Employer's representative considers necessary for his proper supervision of the Works and shall maintain the same in good order. He shall also provide materials, an experienced Surveyor and labour for attendance on the Employer's representative in carrying out operations connected with the supervision of the Works. All charges arising out of such services shall be deemed to be included in his rates in the Bill of Quantities.

Access to sites

The Contractor shall construct and maintain all temporary accesses required for the execution of the Works. The cost of all these Works shall be deemed to be covered by rates and prices quoted by the Contractor.

Pollution

The Contractor shall ensure that during the course of his operations no major pollution of the atmosphere, rivers, reservoir catchment areas or groundwater is allowed to take place.

Tree protection

Trees within the permanent and temporary easement are the property of owners. Specific trees will be identified by the Employer's representative, prior to construction, and the Contractor shall neither remove nor cut their roots unless otherwise directed by the Employer's representative. Any cut down of trees and roots which are within the construction area have to be discussed and confirmed by the Employer's representative.

Geological data and ground water

Any geological or other data that is made available to the Contractor and is relevant to the Works, will be for his guidance only, and no guarantee is given that other ground conditions will not be encountered. No claims based on the geological data provided shall be entertained by the Employer's representative. The Contractor shall be deemed to have made any additional investigations required before submission of his Tender. He shall also investigate the groundwater level and consider costs for protecting excavations against water infiltration. All charges arising out of such services shall be deemed to be included in his rates in the Bill of Quantities.

Watching and Fencing

The Contractor shall arrange to guard the Works both during the day and night from the commencement of the Works until the substantial completion of the Works.

Any excavation or other obstruction likely to cause injury or damage to any person or domestic animals must be fenced off as directed by the Employer's representative.

Tips

The Contractor shall be responsible for provision of all tips, at his own expense, for disposal of all spoil or other rubbish collected during the construction of the Works. Any surplus excavated material not required shall also be carted away to these tips. The site of the tips must be approved by the Employer's representative.

Meetings

The Employer will provide suitable locations (e.g. a board room) for the necessary meetings

Throughout the project period, site meetings will be held every calendar month to discuss the progress of the work, schedule for the ensuing month, methods of construction, procurement, transportation, labors, etc. These meetings can be called at any other time intervals at the request of the Contractor or as directed by the Employer's representative or County Resident Monitor (WSTF).

Inspection by Employer's representative during Defects Liability Period

The Employer's representative will give the Contractor due notice of his intention to carry out inspection during the Defects Liability Period and the Contractor shall upon receipt of such notice arrange for a responsible representative to be present at the times and dates named by the Employer's representative. This representative shall render all necessary assistance and take notice of all matters and things to which his attention is directed by the Employer's representative.

Submission of samples

Before incorporating in the finished work any materials or articles which he supplies under the terms of the Contract, the Contractor shall submit to the Employer's representative for his approval a sample of each respective material or article, and such samples shall be delivered to and kept at his office for reference. All the respective kinds of materials and articles used in and upon the Works, shall be at least equal in quality to the approved samples. Each and every sample shall be a fair average of the bulk material or of the article which it represents. The Employer's representative may decide the method by which each sample to be taken from the bulk material shall be obtained.

Rejected Material

Should any material or manufactured articles be brought on to the site of the Works which are in the judgement of the Employer's representative unsound or of inferior quality or in any way unsuited for the work in which it is proposed to employ them, such materials or manufactured articles shall not be used upon the Works but shall be branded if, in the opinion of the Employer's representative, this is necessary and shall forthwith be removed from the site of the Works, all at the Contractor's expense and in each case as the Employer's representative shall direct.

Quality of material and workmanship

The materials and workmanship shall be of the best of their respective kinds and shall be to the approval of the Employer's representative. In the reading of this Specification the words "to the approval of the Employer's representative" shall be deemed to be included in the description of all materials incorporated in the Works, whether manufactured or natural and in the description of all operations for the due execution of the Works.

Test running of constructed item

Upon substantial completion of the scheme and official inspection which agrees to this, the Contractor shall operate the entire scheme for the test period indicated in the Bill of Quantities under Auxiliary Works.

The Contractor shall supply all necessary personnel and equipment for the test running and together with the Employer's representative shall compile a list of detailed operating instructions that shall be incorporated into the Operation and Maintenance Manual. The Contractor shall further bring to the attention of Employer's representative and of the Employer's operational staff any problem or defects he encounters during this period of test running so that solutions may be found and any necessary alterations made.

Construction Programme

The Contractor shall submit to the Employer's representative for approval, a revision of the Construction Programme in the following manner:

- a. Within thirty (30) days after receiving the Letter of Acceptance, the Contractor shall submit to the Employer's representative for approval, a detailed Programme based on the key date stated hereinafter or other dates which are given in the Letter of Acceptance showing the order of procedure in which he proposes to carry out the Works
- b. This Programme shall indicate clearly all activities and its duration along with the earliest and the latest event, times and the first and last dates of the submission of the Drawings and each date of inspection by the Employer's representative for the section or portion of the Works.
- c. The Programme so prepared shall be rearranged in the form of a Time Bar-chart Schedule of which size shall be in A3). This Time Bar-chart Schedule shall be submitted to the Employer's representative together with the CPM Network (Critical Path Method)
- d. The CPM Network shall be in accordance with commonly accepted practices and shall show graphically the chain of activities / sub-activities and their sequential relationship with each other from the start of construction to the completion of the Contract. The Time Bar-chart Schedule shown in weeks shall list all main activities and its applicable sub-activities.
- e. In preparing the CPM Network and the Time Bar-chart Schedule the Contractor shall make due allowances for possible delays. Under no circumstances shall the CPM Network or the Time Bar-chart Schedule show a completion in excess of the "Time for Completion" stated in the Form of Tender.
- f. The Programme once approved by the Employer's representative shall thereafter be referred to as the Contractual Programme. The Employer's representative's approval of such Programme shall not relieve the Contractor of any of his duties or responsibilities under the Contract.
- g. The Contractual Programme approved shall supersede all other Programmes and shall be deemed to be the Programme on which the Contractor has based his Contract Sum and in accordance with which he will undertake the execution of the Works. This Programme shall become part of the Contract.
- h. The Contractor shall ensure that all the Works especially Electrical and Mechanical Works which may be carried out by the Electrical/Mechanical Sub- Contractor, are well coordinated with the overall Works under the Contract for the efficient execution of the Works, and shall clearly indicate them on the construction programme.
- i. The Contractor shall also describe the conditions of working shifts, if necessary, to execute the Works and whether work needs to be carried out at night and/or on Sundays and holidays. The Contractor should also indicate which particular Works are subject to these timings in his construction programme.
- j. Whenever the Contractor proposes to change the Contractual Programme, approval of the revision shall be obtained in writing from the Employer's

representative.

- k. If the Contractor has fallen behind the approved Contractual Programme or can foresee delay(s) therein, he shall, immediately after such default or event occurred or foreseen or at the request of the Employer's representative submit a revision of the Contractual Programme.

As built and record drawings

The Contractor shall prepare and submit to the Employer's representatives Representative "as-built-drawings" of the works, showing all works as executed after completion of works.

Prior to the issue of any Taking-Over Certificate, the contractor shall submit to the Employer's Representative one full-size original copy, two printed copies of the relevant "as- built-drawings

The works shall not be considered to be completed for the purposes of Taking-Over until such documents have been submitted to the Employer's Representative and in case of any claimed rectification to be made good to his full satisfaction.

The compliance of this Clause by the Contractor is deemed to be covered in his rates as quoted in the Tender.

2. CLEARING SITE

The Contractor shall demolish, break up and remove buildings, walls, gates, fences, advertisements and other structures and obstructions, grub up and remove trees, hedges, bushes and shrubs and clear the site of the works at such time and to the extent required by the Employer's representative: the materials so obtained shall so far as suitable be reserved and stacked for further use; all rubbish and materials for use shall be destroyed or removed from the site, as directed by the Employer's representative.

Vegetation

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

a) Bushes and small Trees

All bushes and small trees, the main stem of which is less than 500mm girth at 1 metre above ground level shall be uprooted (unless otherwise directed by the Employer's representative) and burnt or otherwise disposed off as directed by the Employer's representative.

b) Hedges

Where directed by the Employer's representative, hedges shall be uprooted and disposed off by burning.

c) Felling trees

Where shown on the drawings or directed by the Employer's representative, trees shall be uprooted or cut down as near to ground level as is possible. The rates entered in the Bill of Quantities shall include for cutting down, removing branches and foliage, cutting useful timber into suitable lengths, loading, transporting not more than 1 km. and stacking or disposing off all as directed by the Employer's representative.

For the purpose of measurement trees cut down shall be classified according to their girth at 1 metre above ground level, the cost of grubbing up roots shall be deemed to be covered by the rate for felling trees.

Grubbing up roots

Stumps and tree roots shall, unless otherwise directed, be grubbed up, blasted, burnt or removed and disposed of in approved dumps to be provided by the Contractor. Where directed by the Employer's representative, the holes resulting from grubbing up shall be filled with approved materials, which shall be deposited and compacted in layers not exceeding 225mm loose depth, to the same dry density as

that of the adjoining soil. For the purpose of measurement, tree roots shall be classified according to the mean diameter of the stump measured across the cut.

3. EXCAVATION

Definition and classification of excavated materials

Excavation in the Bills of Quantities shall be classified in two categories:-

d) Common Excavation

Any material which in the opinion of the Employer's representative can be excavated by use of pick axes and hand levers shall be classified as common excavation. Water logged material shall be included in this class. Murram in any form shall be classified as common excavation.

e) Rock

The decision of the Employer's representative in classifying rock shall be final and binding.

Rock in the Bill of Quantities will be itemised in three

classes:- Class 'A'

Soft rock of the type known locally as 'tuff' which in the opinion of the Employer's representative cannot be considered as hard rock but which considerably increases the amount of labour needed for its removal shall be known as Class 'A' rock.

Class 'B'

Very weathered phonolite lava containing many fissures and faults shall be known as hard rock. This type of rock contains stones and boulders of unweathered or incompletely formed blacktrap or lava. A boulder or outcrop of hard rock 1.5 cubic meter or less and grey or green building stone in a formation which is massive and geologically homogeneous, will be deemed to be Class 'B' rock.

Class 'C'

Phonolite in a formation which is massive and geologically homogeneous shall be known as Class 'C' rock.

Excavation of fill

Where excavation reveals a combination of suitable and unsuitable materials, the Contractor shall, wherever the Employer's representative considers it practicable, carry out the excavation in such a manner that the suitable materials are placed separately for use in the works without contamination by the unsuitable materials.

If any suitable material excavated from within the site is, with the agreement of the Employer's representative, taken by the Contractor for his use, sufficient suitable filling material to occupy after specified compaction, a volume corresponding to that which the excavated material occupied, shall, unless otherwise directed by the Employer's representative be provided by the Contractor from his own sources.

No excavated material shall be dumped or run to spoil except on the direction or with the permission of the Employer's representative who may require material which is unsuitable to be retained on site. Material used for haul roads shall not be re-used without the permission of the Employer's representative.

Compaction of fill

All materials used in fill shall be compacted to specification by plant approved by the Employer's representative for that purpose. Maximum compacted thickness of such layers shall not be more than 200mm.

Work on the compaction of plastic materials for fill shall proceed as soon as

practicable after excavation and shall be carried out only when the moisture content is not greater than 2 per cent above the plastic limit for that material. Where the moisture content of plastic material as excavated is higher than this value the material shall be run to spoil and an equal volume of material suitable for filling shall be replaced, unless the Contractor prefers, at his own expense, to wait until the material has dried sufficiently for acceptance again as suitable material.

If any such non-plastic material on excavation is too wet for satisfactory compaction and the Employer's representative orders the moisture content to be lowered or raised, such work shall be treated as included in the rates. All adjustments of moisture content shall be carried out in such a way that the specified moisture content remains uniform throughout compaction.

Work shall be continued until a state of compaction is reached throughout the fill, which shall have relative compaction determined according to B.S. 1377 not less than 85% of maximum dry density at optimum moisture contents. For excavation under Roads, House Drives and Car Parks the backfilling shall be compacted in 150mm layer to 100% maximum dry density.

Embankment over sewers

In carrying embankments over sewer pipes, care shall be taken by the Contractor to have the embankments brought up equally on both sides and over the top of any such structures. Earth embankments shall be formed and compacted in layers of 200mm as the Employer's representative may direct. The filling immediately adjacent to structures shall be deposited and compacted in accordance with the drawings and approved by the Employer's representative. The cost of these works shall be included in the prices entered in the Bill of Quantities for the excavations from which embankments are formed.

Tipped refuse on site

Tipped refuse other than artificial deposits of industrial waste or shale found on the site shall be removed and disposed off in a spoil heap to be provided by the Contractor.

Removal of industrial waste, etc.

Artificial deposits of industrial waste or shale found on the site shall be removed and disposed off as directed by the Employer's representative. Should any particular deposits consist of or contain material which in the opinion of the Employer's representative is suitable for incorporation in fills, all such material shall be used accordingly and deposited in layers and compacted as specified. The prices entered in the Bill of Quantities for the excavation of the material shall include loading, transportation, disposal and compaction of same as and where directed.

Land slips

Remedial works and/or the removal of materials in slips, slides or subsidence and overbreaks of rock extending beyond the lines and slopes, or below the levels shown on the drawings or required by the Employer's representative, will not be paid for.

Classification of material from slips

The classification of material from slips or slides will be in accordance with its condition at the time of removal, regardless of prior condition. Measurement of overbreak in rock excavation shall be that of the space originally occupied by the material before the slide occurred and regardless of its subsequent classification.

Borrow pits

Where for any reason, it becomes necessary to form borrow pits, these shall be located and the work executed in all respects to the instructions of the Employer's representative. They shall be regular in width and shape and admit of ready and

accurate measurement, and shall be properly graded and drained and finished with neatly trimmed slopes.

Streams, watercourses and ditches

Excavations carried out in the permanent diversion, enlargement, deepening, or straightening of streams, watercourses, or ditches shall be performed as directed by the Employer's representative. The rates for such excavations shall include for excavated materials and all pumping, timbering works, and materials necessary for dealing with the flow of water.

Filling of old watercourses

Where watercourses have to be diverted from the sites of embankments or other works, the original channels shall be cleared of all vegetable growths and soft deposits and carefully filled in with approved materials deposited and compacted as directed by the Employer's representative.

Open ditches

Open ditches for drainage purposes shall be cut where and of such cross section as the Employer's representative shall direct and where so required by him they shall be constructed before the cuttings are opened or the embankments begin. The sides shall be dressed fair throughout and the bottom accurately graded so as to carry off the water to the outlet to be provided. The material excavated from the ditches shall be disposed of as directed by the Employer's representative.

Clearing existing ditches

Where directed by the Employer's representative, existing ditches shall be cleared by removing vegetable growths and deposits. The sides shall be shaped fair throughout and the bottoms properly graded. Material removed from existing ditches shall be disposed of in tips provided by the Contractor. The rates included in the Bill of Quantities for clearing ditches shall include for maintaining and keeping clean until and up to maintenance period.

Excavation for foundations below open water

The rates for excavation for foundations below the water level shall include for the cost of all temporary close timbering and shoring, sheet piling, coffer dams, caissons, pumps and other special appliances required and for the draining of any water in the excavation.

Trenches of greater width and depth than instructed

The Contractor shall not be entitled to payment in respect of excavation to any greater extent, whether horizontally or vertically, than is necessary to receive any structure for which the excavation is intended, except where a separate item is provided for additional excavation for working space, timbering, or other temporary work. Excavation to a greater depth or width than directed shall be made good with suitable materials to the satisfaction of the Employer's representative and at the Contractor's cost.

Support for trenches

The sides of trenches shall where necessary be adequately supported to the satisfaction of the Employer's representative by timber or other approved means.

Provision of spoil heaps

The Contractor shall provide spoil heaps at his own expense for the disposal of surplus material and all rubbish collected when clearing the site and during the construction of the works. The sites for these shall be approved by the Employer's representative.

Use of vibratory compaction plant

Where vibratory rollers or other vibratory compaction plant is used, the mechanism for vibration shall be kept working continuously during compaction operations, except

during periods when the Employer's representative permits or directs discontinuance of vibration.

Unless otherwise permitted by the Employer's representative, the frequency for vibration shall be maintained within the range of amplitude and frequency recommended by the manufacturers of the plant for the material to be compacted. The frequency shall be recorded by a tachometer indicating speed of rotation of any shaft producing vibrations.

Water in excavations

All excavations shall be kept free from water, from whatever source, at all times during construction of works until in the opinion of the Employer's representative, any concrete or other works therein are sufficiently set. The Contractor's rates are deemed to cover compliance with this requirement.

The Contractor shall provide all plant, labor and materials required for such work and all costs incurred shall be deemed to be included in his rates for excavation.

4. CONCRETE

This section covers the materials, design of mixes, mixing, transport, placing, compaction and curing of concrete and mortar required in the Works. It also covers formwork and reinforcement for concrete.

Definitions

Structural concrete is any class of concrete which is used in reinforced, pre-stressed or unreinforced concrete construction, which is subject to stress.

Non-structural concrete is composed of materials complying with the Specification but for which no strength requirements are specified and which is used only for filling voids, blinding foundations and similar purposes where it is not subjected to significant stress.

A formed surface is a face which has been cast against formwork.

An unformed surface is a horizontal or nearly horizontal surface produced by screeding or trowelling to the level and finish required.

A pour refers to the operation of placing concrete into any mould, bay or formwork, etc. and also to the volume which has to be filled. Pours in vertical succession are referred to as lifts.

The design of concrete mixes

f) Classes of concrete

The classes of structural concrete to be used in the works shall be those shown on the Drawings and designated in Table 4.1, in which the class designation includes two figures. The first figure is the nominal strength at 28 days expressed in N/mm^2 and the second figure is the maximum nominal size of aggregate in the mix expressed in millimeters.

g) Design of proposed mixes

The Contractor shall design all the concrete mixes called for on the Drawings, making use of the ingredients which have been approved by the Employer's representative for use in the Works and in compliance with the following requirements:-

Table 4.1 - CONCRETE CLASSES AND STRENGTHS

Class of Concrete	Nominal Strength N/mm ²	Maximum Nominal Size of Aggregate mm	Maximum Water / Cement Ratio		Trial Mixes Target Mean Strength (Clause 401 c) N/mm ²	Early Works Test Cubes (Clause 401 d)	
			A	B		Any one Cube N/mm ²	Average of any Group of 4 Cubes N/mm ²
10/75	10	75	0.60	0.55	13.5	8.5	13.3
15/75	15	75	0.60	0.50	21.5	12.8	20.0
15/40	15	40	0.60	0.50	21.5	12.8	20.0
15/20	15	20	0.57	0.50	21.5	12.8	20.0
20/40	20	40	0.55	0.48	31.5	17.0	27.5
20/20	20	20	0.53	0.48	31.5	17.0	27.5
20/10	20	10	0.50	0.48	31.5	17.0	27.5
25/40	25	40	0.52	0.46	36.5	21.3	32.5
25/20	25	20	0.50	0.46	36.5	21.3	32.5
25/10	25	10	0.48	0.46	36.5	21.3	32.5
30/40	30	40	0.50	0.45	41.5	25.5	37.5
30/20	30	20	0.48	0.45	41.5	25.5	37.5
30/10	30	10	0.47	0.45	41.5	25.5	37.5
40/20	40	20	0.46	0.43	51.5	34.0	47.5
40/10	40	10	0.45	0.43	51.5	34.0	47.5

NOTES:

Under water/cement ratio, column A applies to moderate and intermediate exposure, and column B applies to severe exposure. See NOTE after Table 4.2.

In case of concrete having a maximum aggregate size of 40mm or less, 150mm cubes should be used.

Table 4.2 - MINIMUM CEMENT CONTENT

Minimum Cement Content - kg/m ³ of Compacted Concrete				
Class of Concrete	Moderate Exposure	Intermediate Exposure	Severe Exposure	Exposure
10/75,15/75	200	220	270	
15/40, 20/40, 25/40, 30/40	240	270	290	
15/20, 20/20, 25/20, 30/20	260	300	330	
40/20	300	320	330	
20/10, 25/10, 30/10	300	340	390	
40/10	310	340	390	

Note: the minimum cement contents shown in the above table are required in order to achieve impermeability and durability. In order to meet the strength requirements in the Specification higher contents may be required.

The categories applicable to the Works are based broadly on the factors listed hereunder:

a) Moderate exposure

Surface sheltered from severe rain; buried concrete, concrete continuously under water

b) Intermediate exposure

Surface exposed to driving rain; alternate wetting and drying; traffic; corrosive fumes; heavy condensation

c) Severe exposure

Surface exposed to sea water, moorland water having a pH of 4.5 or less, groundwater containing sulphates.

- a) The Contractor shall take necessary action to remedy concrete which does not comply with this Specification. Such action may include but is not necessarily confined to the following:-
- b) Increasing the frequency of sampling until control is again established.
- c) Cutting test cores from the concrete and testing in accordance with SRN 117.
- d) Carrying out strengthening or other remedial work to the concrete where possible or appropriate.
- e) Carrying out non-destructive testing such as load tests on beams.
- f) Removing the concrete.

Mixing concrete

Before any plant for batching, mixing, transporting, placing, compacting and finishing concrete is ordered or delivered to site, the Contractor shall submit to the Employer's representative full details including type of mixer which he proposes to use and the arrangements he proposes to make.

h) Ready mixed concrete

The Employer's representative may approve the use of ready mixed concrete provided that:

- a) the proposed mixes, the material to be used and the method of storage and mixing comply with the requirements of the Specification;
and
- b) adequate control is exercised during mixing.

Approval for the use of ready mixed concrete may be withdrawn if the Employer's representative is not satisfied with the control of the materials being used and control during mixing.

The mixed concrete shall be transported from the central plant using transit lorry mixers and/or agitator trucks.

i) Small scale concrete mixer

Alternatively a small-scale concrete mixer, self-powered with electricity or fuel can be used if the Contractor is able to prove the good working conditions of the mixer to the full satisfaction of the Employer's representative.

All mixing operations shall be under the control of an experienced supervisor.

The aggregate storage bins shall be provided with drainage facilities arranged so that drainage water is not discharged to the weigh hoppers. Each bin shall be drawn down at least once per week and any accumulations of mud or silt removed.

Cement and aggregate shall be batched by weight. Water may be measured by weight or volume.

The weights of cement and of each size of aggregate as indicated by the mechanisms employed shall be within a tolerance of plus or minus two percent of the respective weights per batch agreed by the Employer's representative.

The Contractor shall provide standard test weights at least equivalent to the maximum working load used on the most heavily loaded scale and other auxiliary equipment required for checking the satisfactory operation of each scale or other measuring device.

The nominal drum or pan capacity of the mixer shall not be exceeded. The turning speed and the mixing time shall be as recommended by the manufacturer, but in addition, when water is the last ingredient to be added, mixing shall continue for at least one minute after all the water has been added to the drum or pan.

The blades of pan mixers shall be maintained within the tolerances specified by the manufacturer of the mixer and the blades shall be replaced when it is no longer possible to maintain the tolerances by adjustment.

The water to be added to the mix shall be reduced by the amount of free water contained in the coarse and fine aggregates. This amount shall be determined by the Contractor by a method agreed by the Employer's representative immediately before mixing begins each day and thereafter at least once per hour during concreting and for each delivery of aggregates during concreting. When the correct quantity of water, determined as set out in the Specification, has been added to the mix, no further water shall be added, either during mixing or subsequently.

After mixing for the required time, each batch shall be discharged completely from the mixer before any materials for the succeeding batch are introduced.

Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before any fresh concrete is mixed and thereafter the first batch of concrete through the mixers shall contain only half the normal quantity of coarse aggregate. This batch shall be mixed for one minute longer than the time applicable to a normal batch.

Mixers shall be cleaned out before changing to another type of cement.

j) Hand-mixed concrete

Concrete for structural purposes shall not be mixed by hand. Where non-structural concrete is required, hand mixing may be carried out subject to the agreement of the Employer's representative.

The mixing shall be done on a hard impermeable surface. The materials shall be turned over not less than three times dry, water shall then be sprayed on and the materials again turned over not less than three times in a wet condition and worked together until a mixture of uniform consistency is obtained.

For hand mixed concrete the specified quantities of cement shall be increased by 10% and not more than 0.5 cubic meter shall be mixed at one time. During windy weather efficient precautions shall be taken to prevent cement from being blown away during the process of gauging and mixing.

Transport of concrete

The concrete shall be discharged from the mixer and transported to the Works by means which shall prevent adulteration, segregation or loss of ingredients, and which shall ensure that the concrete is of the required workability and consistency at the point and time of placing.

In case of premixed concrete the mixed concrete shall be transported using agitator trucks or transit truck mixers,

In case of the use of a small-scale concrete mixer wheel barrows might be sufficient.

The interval between feeding of water into the mixer drum and final discharging of the concrete shall not exceed one hour.

The time elapsed between mixing and placing a batch of concrete shall be as short as practicable and in any case not longer than will permit completion of placing and compaction before the onset of initial set. If the placing of any batch of concrete is delayed beyond this period, the concrete shall not be placed in the Works.

Placing of concrete

k) Consent for placing

Concrete shall not be placed in any part of the Works until the Employer's representative's consent has been given in writing, and the Contractor shall give the Employer's representative at least 1 full working days' notice of his intention to place concrete.

If concrete placing is not commenced within 24 hours of the Employer's representative's consent the Contractor shall again request consent as specified above.

l) Preparation of surface to receive concrete

Before deposition of further concrete they shall be clean, hard and sound and shall be wet but without any free-standing water.

Any flow of water into an excavation shall be diverted through proper side drains to a sump, or be removed by other suitable methods which will prevent washing away the freshly deposited concrete or any of its constituents. Any underdrains constructed for this purpose shall be completely grouted up when they are no longer required by a method agreed by the Employer's representative.

Unless otherwise instructed by the Employer's representative surfaces against which concrete is to be placed shall receive a prior coating of mortar mixed in the proportions similar to those of the fines portion in the concrete to be placed. The mortar shall be kept ahead of the concrete. The mortar shall be well worked into all parts of the excavated surface and shall not be less than 5mm thick.

If any fissures have been cleaned out they shall be filled with mortar or with concrete as instructed by the Employer's representative.

The amount of mortar placed at any one time shall be limited so that it does not dry out or set before being covered with concrete.

m) Concrete pump or placer

In case the contractor uses a concrete pump or place the type and capacity of pump shall be determined to meet the specified requirements, taking into account the placing speed, construction schedule, quality of concrete, location to which concrete is poured, etc. Diameter of the delivery pipes shall be not smaller than 3 times of the maximum size of aggregates to be used in the concrete.

Delivery pipes shall be so installed as to permit easy removal. Before starting the pump or placer operation, about one cubic metre of mortar with the same proportion of water, admixture, cement and fine aggregate as designated for the regular concrete mix shall be passed through the pipe. The pipe shall be set as straight and horizontally as possible to prevent clogging of the concrete mix in the pipe. The supports of the pipe line shall be stiff enough to fix the pipes firmly without adverse effect on forms and reinforcing steel already set in position. Care shall be taken to prevent leakage of the concrete mix from the pipe line or any other part.

n) Placing procedures

The concrete shall be deposited as nearly as possible in its final position. It shall be placed so as to avoid segregation of the concrete and displacement of the reinforcement, other embedded items, or formwork. It shall be brought up in layers approximately parallel to the construction joint planes and not exceeding 500mm in compacted thickness unless otherwise permitted or directed by the Employer's representative, but the layers shall not be thinner than four times the maximum

nominal size of aggregate.

Layers shall be placed so that they do not form feather edges nor shall they be placed on a previous layer which has taken its initial set. In order to comply with this requirement, a layer may be started before completion of the preceding layer.

All the concrete in a single bay or pour shall be placed in a continuous operation. It shall be carefully worked round all obstructions, irregularities in the foundations and the like so that all parts are completely full of compacted concrete with no segregation or honey-combing. It shall also be carefully worked round and between waterstops, reinforcement, embedded steelwork and similar items which protrude above the surface of the completed pour.

All work shall be completed on each batch of concrete before its initial set commences and thereafter the concrete shall not be disturbed before it has set hard. No concrete that has partially hardened during transit shall be used in the Works and the transport of concrete from the mixer to the point of placing shall be such that this requirement can be complied with.

Concrete shall not be placed during rain which is sufficiently heavy or prolonged as to wash mortar from coarse aggregate on the exposed faces of fresh concrete. Means shall be provided to remove any water accumulating on the surface of the placed concrete. Concrete shall not be deposited into such accumulation of water.

In drying weather, covers shall be provided for all fresh concrete surfaces which are not being worked on. Water shall not be added to concrete for any reason.

When concrete is discharged above its place of final deposition, segregation shall be prevented by the use of chutes, downpipes, trunking, baffles or other appropriate devices, as approved by the Employer's representative.

Forms for walls, columns and other thin sections of significant height shall be provided with openings or other devices that will permit the concrete to be placed in a manner that will prevent segregation and accumulations of hardened concrete on the formwork or reinforcement above the level of the placed concrete.

o) Interruptions to placing

If concrete placing is interrupted for any reason and the duration of the interruption cannot be forecast or is likely to be prolonged, the Contractor shall immediately take the necessary action to form a construction joint so as to eliminate as far as possible feather edges and sloping top surfaces and shall thoroughly compact the concrete already placed in accordance with Clause 406. All work on the concrete shall be completed while it is still plastic and it shall not thereafter be disturbed until it is hard enough to resist damage. Plant and materials to comply with this requirement shall be readily available at all times during concrete placing.

Before concreting is resumed after such an interruption the Contractor shall cut out and remove all damaged or un-compacted concrete, feather edges or any other undesirable features and shall leave a clean sound surface against which the fresh concrete may be placed.

p) Dimensions of pours

Unless otherwise agreed by the Employer's representative, pours shall not be more than two meter high and shall as far as possible have a uniform thickness over the plan area of the pour. Concrete shall be placed to the full planned height of all pours except in the circumstances described in sub-clause 405(d).

The Contractor shall plan the dimensions and sequence of pours in such a way that cracking of the concrete does not take place due to thermal or shrinkage stresses.

q) Placing sequence

The Contractor shall arrange that as far as possible the intervals between placing successive lifts of concrete in one section of the Works are of equal duration. This duration shall normally be not less than three or more than seven days under temperate weather conditions unless otherwise agreed by the Employer's representative.

Where required by the Employer's representative to limit the opening of construction joints due to shrinkage, concrete shall not be placed against adjacent concrete which is less than 21 days old.

When the drawings call for contraction gaps in concrete, these shall be of the widths and in the locations shown on the drawings and they shall not be filled until the full time interval shown on the drawings has elapsed.

Compaction of concrete

The concrete shall be fully compacted throughout the full extent of the placed layer. It shall be thoroughly worked against the formwork and around any reinforcement and other embedded items, without displacing them. Particular care shall be taken at arises and other confined spaces. Successive layers of the same pour shall be thoroughly worked together.

Concrete shall be compacted with the assistance of mechanical immersion vibrators.

Immersion vibrators shall operate at a frequency of between 7,000 and 10,000 cycles per minute. The Contractor shall ensure that vibrators are operated at pressures and voltages not less than those recommended by the manufacturer in order that the compactive effort is not reduced.

A sufficient number of vibrators shall be operated to enable the entire quantity of concrete being placed to be vibrated for the necessary period and, in addition, standby vibrators shall be available for instant use at each place where concrete is being placed.

Vibration shall be continued at each point until the concrete ceases to contract, a thin layer of mortar has appeared on the surface and air bubbles have ceased to appear. Vibrators shall not be used to move concrete laterally and shall be withdrawn slowly to prevent the formation of voids.

Vibration shall not be applied by way of reinforcement nor shall vibrators be allowed to touch reinforcement or other embedded items. The vibrators shall be inserted vertically into the concrete to penetrate the layer underneath at regular spacing. The spacing shall not exceed the distance from the vibrator over which vibration is visibly effective.

Curing of concrete

r) General

Concrete shall be protected during the first stage of hardening from loss of moisture and from the development of temperature differentials within the concrete sufficient to cause cracking. The methods used for curing shall not cause damage of any kind to the concrete.

Curing shall be continued for as long as may be necessary to achieve the above objectives but in any case for at least seven days or until the concrete is covered by later construction whichever is the shorter period.

The curing process shall commence as soon as the concrete is hard enough to resist damage from the process, and in the case of large areas or continuous pours, shall commence on the completed section of the pour before the rest of the pour is finished.

Details of the Contractor's proposals for curing concrete shall be submitted to the Employer's representative before the placing of concrete commences in the Works.

Formed surfaces may be cured by retaining the formwork in place for the required curing period.

If instructed by the Employer's representative, the Contractor shall, in addition to the curing provisions set out above provide a suitable form of shading to prevent the direct rays of the sun reaching the concrete surfaces for at least the first four days of the curing period.

s) Loss of moisture

Exposed concrete surfaces shall be closely covered with impermeable sheeting, properly secured to prevent its removal by wind and the development of air spaces beneath it. Joints in the sheeting shall be lapped by at least 300mm.

If for some reason it is not possible to use impermeable sheeting, the Contractor shall keep the exposed surfaces continuously wet by means of a water spray or by covering with a water absorbent material which is kept wet.

Water used for curing shall be of the same quality as that used for concrete mixing.

t) Limitation of temperature differential

The Contractor shall limit the development of temperature differentials in concrete after placing by any means appropriate to the circumstances including the following:

- a. limiting concrete temperatures at placing
- b. use of low heat cement, subject to the agreement of the Employer's representative;
- c. insulation of exposed concrete surface by insulating blankets. Such blankets shall have an insulation value at least equivalent to 50mm of dry mineral wool;
- d. leaving formwork in place during the curing period. Steel forms shall be suitably insulated on the outside;
- e. preventing rapid dissipation of heat from surfaces by shielding from wind;
- f. avoiding the use of water sprays when such use would cause rapid cooling of the surface.

Protection of fresh concrete

Freshly placed concrete shall be protected from rainfall and from water running over the surface until it is sufficiently hard to resist damage from these causes.

No traffic shall be allowed on any concrete surface until such time as it is hard enough to resist damage by such traffic.

Concrete placed in the Works shall not be subjected to any loading until it has attained at least its nominal strength.

If the Contractor desires to impose loads on newly-placed concrete, he shall make at least three test cubes and cure them in the same conditions as the concrete they represent. These cubes shall be tested singly at suitable intervals in order to estimate the time at which the nominal strength is reached.

Concreting in hot weather

u) General

The Contractor shall prevent damage to concrete arising from exposure to extreme temperatures, and shall maintain in good working order all plant and equipment required for this purpose.

In the event that conditions become such that even with the use of the equipment the requirements cannot be met, concrete placing shall immediately cease until such time

as the requirements can again be met.

v) Concrete placing in hot weather

During hot weather the Contractor shall take all measures necessary to ensure that the temperature of concrete at the time of placing in the Works does not exceed 30 degrees centigrade and that the concrete does not lose any moisture during transporting and placing.

Such measures may include but are not necessarily limited to the following:-

- a) Shielding aggregates from direct sunshine.
- b) Use of a mist water spray on aggregates
- c) Shields on mixing plants and transporting equipment.
- d) Cooling the mixing water. If ice is used for this purpose it should preferably be in flake form. Lump ice shall not be allowed to enter the tank supplying the mixer drum.
- e) Covering skips closely with polythene sheet so that the latter is in contact with the concrete.

Areas in which concrete is to be placed shall be shielded from direct sunshine and rock or concrete surfaces shall be thoroughly wetted to reduce absorption of water from the concrete placed on or against them.

After concrete in any part of an area has been placed, the selected curing process shall be commenced as soon as possible. If any interval occurs between completion of placing and start of curing, the concrete shall be closely covered during the interval with polythene sheet to prevent loss of moisture.

Finishes on unformed surfaces

Horizontal or nearly horizontal surfaces which are not cast against formwork shall be finished to the class shown on the drawings and defined hereunder.

w) UF 1 Finish

All surfaces on which no higher class of finish is called for on the drawings or instructed by the Employer's representative shall be given a UF 1 finish.

The concrete shall be levelled and screened to produce a uniform plain or ridged surface, surplus concrete being struck off by a straight edge immediately after compaction.

x) UF 2 Finish

This is a floated finish for roof or floor slabs and other surfaces where a hard trowelled surface is not required.

The surface shall first be treated as a Class UF 1 finish and after the concrete has hardened sufficiently, it shall be floated by hand or machine sufficiently only to produce a uniform surface free from screed marks.

y) UF 3 Finish

This is a hard trowelled surface for use where weather resistance or appearance is important, or which is subject to high velocity water flow.

The surface shall be floated as for a UF 2 finish but to the tolerance stated below. When the moisture film has disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, it shall be steel trowelled under firm pressure to produce a dense, smooth uniform surface free from trowel marks.

Table 4.4 - SURFACE TOLERANCES

Class of Finish	Tolerance in mm. See notes		
	A	B	C
UF 1	N/A	10	+ 20 or - 10
UF 2	Nil	10	+ 20 or - 10

UF 3	Nil	5	+ 12.5 or -7.5
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Notes:

- a) Col. A is the maximum allowable value of any sudden change of level in the surface.
- b) Col. B is the maximum allowable value of any gradual irregularity of the surface, as indicated by the gap between the surface and a three meter long straight edge or correctly shaped template placed on the surface.
- c) Col. C is the maximum allowable value of the difference in level or position between a three meter long straight edge or correctly shaped template placed on the surface and the specified level or position of that surface.

Where dimensional tolerances are given on the drawings or in this Special Specification they shall take precedence over those given in Table 4.4.
If not specified further in the drawings Class UF 1 shall apply for all unformed surfaces.

Mortar

This clause covers mortar for use ahead of concrete placing, and other uses not covered elsewhere in the Specification.

Mortar shall be composed of fine aggregate and ordinary Portland cement. The mix proportions shall be as stated on the drawings or elsewhere in this Specification or if not stated shall be one part of cement to two parts of fine aggregate by weight.

Small quantities of mortar may be hand mixed but for amounts over 0.5 cubic metre a mechanical mixer shall be used.

The water content of the mortar shall be as low as possible consistent with the use for which it is required but in any case the water/cement ratio shall not be more than 0.5.

Mortar which is specified as 'dry pack' shall be mixed with sufficient water for the mix to become cohesive but not plastic when squeezed in the hand. Dry pack mortar shall be rammed into the cavity it is required to fill, using a hand rammer with sufficient force to ensure full compaction.

Concrete for secondary purposes

a) Non-structural concrete (NS concrete) shall be used only for non-structural purposes where shown on the drawings.

NS concrete shall be composed of ordinary Portland cement complying with requirements and aggregates complying within the grading limits.

The weight of cement mixed with 0.3 cubic meter of combined or all-in aggregate shall not be less than 50 kg. The mix shall be proportioned by weight or by volume. The maximum aggregate size shall be 40mm nominal.

The concrete shall be mixed by machine or by hand to a uniform colour and consistency before placing. The quantity of water used shall not exceed that required to produce a concrete with sufficient workability to be placed and compacted where required.

The concrete shall be compacted by hand or by mechanical vibration.

b) No Fines concrete (NF concrete) is intended for use where a porous concrete is required and shall only be used where shown on the drawings or instructed by the

Employer's representative.

The mix shall consist of ordinary Portland cement complying with SRN 115. The aggregate size shall be 40mm to 10mm only. The weight of cement mixed with 0.3 cubic metre of aggregate shall not be less than 50 kg. The quantity of water shall not exceed that required to produce a smooth cement paste which will coat evenly the whole of the aggregate.

Records of concrete placing

Records, in a form agreed by the Employer's representative, shall be kept by the Contractor of the details of every pour of concrete placed in the Works. These records shall include class of concrete, location of pour, date of pour, ambient temperature and weather conditions during mixing and placing and concrete temperature at time of placing, moisture contents of aggregates, details of mixes, batch numbers, cement batch number, results of all tests undertaken

Construction joints

Whenever concrete is to be bonded to other concrete which has hardened, the surface of contact between the sections shall be deemed a construction joint.

Where construction joints are shown on the drawings, the Contractor shall form such joints in those positions. The location of joints which the Contractor requires to make for the purpose of construction shall be subject to the agreement of the Employer's representative. Construction joints shall be in vertical or horizontal planes except in sloping slabs where they shall be normal to the exposed surface or elsewhere where the drawings require a different arrangement.

Construction joints shall be so arranged as to reduce to a minimum the effects of shrink- age in the concrete after placing, and shall be placed in the most advantageous positions with regard to stresses in the structures and the desirability of staggering joints.

Feather edges of concrete at joint shall be avoided and any feather edges which may have formed where reinforcing bars project through a joint shall be cut back until sound concrete has been reached.

The intersection of horizontal or near horizontal joints and exposed faces of concrete shall appear as straight lines produced by use of a guide strip fixed to the formwork at the top of the concrete lift, or by other means acceptable to the Employer's representative.

The surface of the fresh concrete in horizontal or near horizontal joints shall be thoroughly cleaned and roughened by means of high pressure water and air jets when the concrete is hard enough to withstand the treatment without the leaching of cement. The surface of vertical or near vertical joints shall be similarly treated if circumstances permit the removal of formwork at a suitable time.

Where concrete has become too hard for the above treatment to be successful, the surface whether formed or free is to be thoroughly scabbled by mechanical means or wet sand blasted and then washed with clean water. The indentations produced by scabbling shall be not less than 10mm deep and shall not extend closer than 40mm to a finished face.

If instructed by the Employer's representative the surface of the concrete shall be thoroughly brushed with a thin layer of mortar composed of one part of cement to two parts of sand by weight immediately prior to the deposition of fresh concrete. The mortar shall be kept just ahead of the fresh concrete being placed and the fresh layer of concrete shall be thoroughly and systematically vibrated to full depth to ensure complete bond with the adjacent layer.

No mortar or concrete may be placed in position on or against a construction joint until the joint has been inspected and passed by the Employer’s representative.

Expansion and contraction joints

Expansion and contraction joints are discontinuities in concrete designed to allow thermal or other movements in the concrete.

Expansion joints are formed with a gap between the concrete faces to permit subsequent expansion of the concrete. Contraction joints are formed to permit initial contraction of the concrete and may include provision for subsequent filling.

Expansion and contraction joints shall be formed in the positions and in accordance with the details shown on the drawings or elsewhere in the Specifications.

Grouting of pockets and holes and underpinning of baseplates

Pockets and holding-down bolt holes shall be thoroughly cleaned out using compressed air and water jet. Holes drilled by a diamond bit shall be roughened. The pockets and holes shall be filled with grout consisting of cement and clean fresh water mixed in proportion of two parts by weight of cement to one part by weight of water. The pouring of liquid grout shall cease as soon as each hole is filled and any excess grout on the surface of the concrete foundation shall be completely removed and the surface dried off before the next operation proceeds.

The space between the top surface of foundation concrete and the underside of the baseplates shall be filled with a special mortar made up in the following proportions:-

- Portland Cement 50 kg.
- Fine aggregate 50 kg.

An additive acceptable to the Employer’s representative to counteract shrinkage in proportions recommended by the manufacturer.

The special mortar shall be mixed with the lowest water-cement ratio which will result in a consistency of mix of sufficient workability to enable maximum compaction to be achieved.

The special mortar shall then be well rammed in horizontally below the baseplate and from one edge only until it is extruded from the other three sides. The mortar which has extruded shall then be rammed back to ensure complete support without voids.

Remedial work to defective surfaces

If on stripping any formwork the concrete surface is found to be defective in any way, the Contractor shall make no attempt to remedy such defects prior to the Employer’s representative’s inspection and the receipt of any instructions which the Employer’s representative may give.

Defective surfaces shall not be made good by plastering.

Areas of honey combing (of a mild nature) which the Employer’s representative agrees may be repaired shall be cut back to sound concrete or to 75mm whichever is the greater distance. In the case of reinforced concrete the area shall be cut back to at least 25mm clear distance behind the reinforcement or to 75mm, whichever is the greater distance. The cavity shall have sides at right angles to the face of the concrete. After cleaning out with water and compressed air, a thin layer of cement grout shall be brushed on to the concrete surface in the cavity and it shall then be filled immediately with concrete of the same class as the main body but with aggregate larger than 20mm nominal size removed. A form shall be used against the cavity, provided with a lip to enable concrete to be placed. The form shall be filled to a point above the top edge of the cavity.

After seven days the lip of concrete shall be broken off and the surface ground smooth.

Surface irregularities which are outside the limits of tolerance shall be ground down in the manner and to the extent instructed by the Employer's representative.

Severe honeycombing and defects other than those mentioned above shall be dealt with as instructed by the Employer's representative.

Bending reinforcement

Bending and cutting of reinforcement shall comply with specifications as on bar bending schedules and as shown on the drawings.

The Contractor shall satisfy himself as to the accuracy of any bar bending schedules supplied and shall be responsible for cutting, bending, and fixing the reinforcement in accordance with the drawings. Any discrepancies should be brought to the attention of the Employer's representative prior to ordering the reinforcement.

Bars shall be bent cold by the application of slow steady pressure. At temperatures below 5 degrees centigrade the rate of bending shall be reduced if necessary to prevent fracture of the steel.

After bending, bars shall be securely tied together in bundles or groups and legibly labelled as set out .

Reinforcement shall be thoroughly cleaned and all dirt, scale, loose rust, oil and other contaminants removed before it is placed in the Works.

Fixing reinforcement

Reinforcement shall be securely fixed in position within a dimensional tolerance of 20mm in any direction parallel to a concrete face and within a tolerance of 5mm at right angles to a face, provided that the cover is not thereby decreased below the minimum shown on the drawings, or if not shown shall be not less than 25mm or the diameter of the bar, whichever is the greater. Cover on distribution steel shall not be less than 15mm or the diameter of the bar whichever is the greater.

Unless otherwise agreed by the Employer's representative, all intersecting bars shall either be tied together with 1.6mm diameter soft annealed iron wire and the ends of the wire turned into the body of the concrete, or shall be secured with a wire clip of a type agreed by the Employer's representative.

Spacer blocks shall be used for ensuring that the correct cover is maintained on the reinforcement. Blocks shall be as small as practicable and of a shape agreed by the Employer's representative. They shall be made of mortar mixed in the proportions of one part of cement to two parts of sand. Wires cast into the block for tying in to the reinforcement shall be 1.6mm diameter soft annealed iron.

Alternatively another type of spacer block may be used subject to the Employer's representative's agreement.

Reinforcement shall be rigidly fixed so that no movement can occur during concrete placing. Any fixings made to the formwork shall not be within the space to be occupied by the concrete currently being placed.

Mechanical splices shall not be used.

The Contractor shall ensure that reinforcement left exposed in the Works shall not suffer distortion, displacement or other damage. When it is necessary to bend protruding reinforcement aside temporarily, the radius of the bend shall not be less than four times the bar diameter for mild steel bars or six times the bar diameter for high yield bars. Such bends shall be carefully straightened before concrete placing continues, without leaving residual links or damaging the concrete around them. In no circumstances will heating and bending of high yield bars be permitted.

High tensile bars shall not be bent after placing in the Works.

Before concrete is placed in any section of the Works which includes reinforcement, the reinforcement shall be completely clean and free from all contamination including concrete which may have been deposited on it from previous operations.

The Employer's representative's approval for concrete placing is to be sought in writing for each pour, leaving adequate time to inspect and rectify any defects noted in the formwork, falsework, reinforcement, scaffolding, concreting arrangements, etc.

5. FORMWORK

Definitions

Formwork means the surface against which concrete is placed to form a face, together with all the immediate supports to retain it in position while concrete is placed.

Falsework means the structural elements supporting both the formwork and the concrete until the concrete becomes self-supporting.

A formed face is one which has been cast against formwork.

An exposed face is one which will remain visible when construction has been completed.

Construction of formwork and false work

Before construction begins, the Contractor shall submit to the Employer's representative, drawings showing details of the proposed formwork and falsework.

Formwork and falsework shall be so constructed that they will support the loads imposed on them by the fresh concrete together with additional stresses imposed by vibrating equipment and by construction traffic, so that after the concrete has hardened the formed faces shall be in the positions shown on the drawings within the tolerances set out in Clause 506.

Ground supports shall be properly founded on footings designed to prevent settlement.

Joints in formwork for exposed faces shall, unless otherwise specified, be evenly spaced and horizontal or vertical and shall be continuous or form a regular pattern.

All joints in formwork including formwork for construction joints shall be tight against the escape of cement, water and fines. Where reinforcement projects through formwork, the form shall fit closely round the bars.

Formwork shall be so designed that it may be easily removed from the work without damage to the faces of the concrete. It shall also incorporate provisions for making minor adjustments in position if required, to ensure the correct location of concrete faces. Due allowance shall be made in the position of all formwork for movement and settlement under the weight of fresh concrete.

Where overhangs in formwork occur, means shall be provided to permit the escape of air and to ensure that the space is filled completely with fully compacted concrete.

Formwork shall be provided for concrete surfaces at slopes of 30 degrees to the horizontal or steeper. Surfaces at slopes less than 20 degrees may be formed by screeding. Surfaces at slopes between 20 degrees and 30 degrees shall generally be formed unless the Contractor can demonstrate to the satisfaction of the Employer's

representative that such slopes can be screeded with the use of special screed boards to hold the concrete in place during vibration.

Horizontal or inclined formwork to the upper surface of concrete shall be adequately se- cured against uplift due to the pressure of fresh concrete. Formwork to voids within the body of the concrete shall also be tied down or otherwise secured against floating.

The internal and external angles on concrete surfaces shall be formed with fillets and chamfers of the sizes shown on the drawings unless otherwise instructed by the Employer's representative.

Supports for formwork for non-water retaining structures may be bolted to previously placed concrete provided the type of bolt used is acceptable to the Employer's representative. If metal ties through the concrete are used in conjunction with bolts, the metal left in shall not be closer than 50mm to the face of the concrete.

Supports for formwork for water retaining structures may be bolted to previously placed concrete provided the type of bolts and positions of fixing are acceptable to the Employer's representative. After concreting the Contractor shall remove all support bolts and seal all holes with well rammed cement/sand mortar containing approved waterproofing cement additive. Metal ties which would be left in the concrete shall not be permitted.

Formwork shall not be re-used after it has suffered damage which in the opinion of the Employer's representative is sufficient to impair the finished surfaces of the concrete.

Where precast concrete elements are specified for use as permanent formwork, or pro- posed by the Contractor and agreed by the Employer's representative, they shall comply with the requirements of the Specification. Such elements shall be set true to line and level within the tolerances prescribed for the appropriate class of finish in Clause 506 and fixed so that they cannot move when concrete is placed against them.

Preparation of formwork

Before any reinforcement is placed into position within formwork, the latter shall be thoroughly cleaned and then dressed with a release agent. The agent shall be either a suit- able oil incorporating a wetting agent, an emulsion of water suspended in oil or a low viscosity oil containing chemical agents. The Contractor shall not use an emulsion of oil suspended in water nor any release agent which causes staining or discoloration of the concrete, air holes on the concrete surface, or retards the set of the concrete.

In order to avoid colour difference on adjacent concrete surfaces, only one type of re- lease agent shall be used in any one section of the works.

In cases where it is necessary to fix reinforcement before placing formwork, all surface preparation of formwork shall be carried out before it is placed into position. Before placing concrete all dirt, construction debris and other foreign matter shall be re- moved completely from within the placing area.

Before concrete placing commences, all wedges and other adjusting devices shall be secured against movement during concrete placing and the Contractor shall maintain a watch on the formwork during placing to ensure that no movement occurs.

Removal of formwork

Formwork shall be carefully removed without shock or disturbance to the concrete. No formwork shall be removed until the concrete has gained sufficient strength to withstand safely any stresses to which it may thereby be subjected.

The minimum periods which shall elapse between completion of placing concrete and removal of forms are given in Table 5.1 and apply to ambient temperatures higher than 10 degrees centigrade. At lower temperatures or if cement other than ordinary

Portland are involved, the Employer's representative may instruct that longer periods be used.

Alternatively, formwork may be removed when the concrete has attained the strength set out in Table 5.1, provided that the attained strength is determined by making test cubes and curing them under the same conditions as the concrete to which they refer.

Compliance with these requirements shall not relieve the Contractor of his obligation to delay removal of formwork until the removal can be completed without damage to the concrete.

Table 5.1 - MINIMUM PERIODS FOR FORMWORK REMOVAL

Position of Formwork	Min. period for temp over 10 degrees Centi-grade	Strength to be attained
Vertical or near vertical faces of mass concrete	24 hours	0.2 C
Vertical or near vertical faces of rein- forced walls, beams and columns	48 hours	0.3 C
Underside of arches, beams and slabs (formwork only)	4 days	0.5 C
Supports to underside of arches, beams and slabs	14 days	C
Arched linings in tunnels and under-ground works	24 hours	4 N/mm ²

Note: C is the nominal strength for the class of concrete used.

If the Contractor wishes to strip formwork from the underside of arches, beams and slabs before the expiry of the period for supports set out above, it shall be designed so that it can be removed without disturbing the supports. The Contractor shall not remove sup- ports temporarily for the purpose of stripping formwork and subsequently replace them.

As soon as the formwork has been removed, bolt holes in concrete faces other than construction joints which are not required for subsequent operations shall be completely filled with mortar sufficiently dry to prevent any slumping at the face. The mortar shall be mixed in the same proportions as the fine aggregate and cement in the surrounding concrete and with the same materials and shall be finished flush with the face of the concrete.

Surface finishes on formed surfaces
Classes of finish

The surface finish to be achieved on formed concrete surfaces shall be as shown on the drawings and defined hereunder:-

z) Class F1 finish

This finish is for surfaces against which backfill or further concrete will be placed. Form- work may be sawn boards, sheet metal or any other suitable material which will prevent the loss of fine material from the concrete being placed.

aa) Class F2 finish

This finish is for surfaces which are permanently exposed to view but where the

highest standard of finish is not required. Forms to provide a Class F2 finish shall be faced with wrought thicknesses tongued and grooved boards with square edges arranged in a uniform pattern and close jointed or with suitable sheet material. The thickness of boards or sheets shall be such that there shall be no visible deflection under the pressure exerted by the concrete placed against them. Joints between boards or panels shall be horizontal and vertical unless otherwise directed. This finish shall be such as to require no general filling of surface pitting, but fins, surface discoloration and other minor defects shall be remedied by methods agreed by the Employer's representative.

bb) Class F3 finish

This finish is for surfaces which will be in contact with water flowing at high velocity, and for surfaces prominently exposed to view where good appearance is of special importance. To achieve this finish, which shall be free of board marks, the formwork shall be faced with plywood complying with B.S. 1088 or equivalent material in large sheets. The sheets shall be arranged in an approved pattern. Wherever possible, joints between sheets shall be arranged to coincide with architectural features or changes in direction of the surface.

All joints between panels shall be vertical and horizontal unless otherwise directed. Suitable joints shall be provided between sheets to maintain accurate alignment in the plane of the sheets. Unfaced wrought boarding or standard steel panels will not be permitted for Class F3 finish. The Contractor shall ensure that the surface is protected from rust marks, spillages and stains of all kinds.

Tolerances

All parts of formed concrete surfaces shall be in the positions shown on the drawings within the tolerances set out in Table 5.2.

In cases where the drawings call for tolerances other than those given in Table 5.2 the tolerances shown on the drawings shall take precedence.

Where precast units have been set to a specified tolerance, further adjustments shall be made as necessary to produce a satisfactory straight or curved line. When the Employer's representative has approved the alignment, the Contractor shall fix the units so that there is no possibility of further movement.

Table 5.2 - TOLERANCES

Class of finish	Tolerances in mm (See Note)		
	A	B	C
F1	10	10	+ 25 to - 10
F2	5	10	+ or - 15
F3	2	5	+ or - 10

Note: The tolerances A, B and C given in the table are defined as follows:

1. Column A is an abrupt irregularity in the surface due to misaligned formwork or defects in the face of the formwork.
2. Column B is a gradual deviation from a plane surface as indicated by a straight edge 3m long. In the case of curved surfaces the straight edge shall be replaced by a correctly shaped template.
3. Column C is the amount by which the whole or part of a concrete face is displaced from the correct position shown on the drawings.

6. MASONRY

General

All masonry work shall be constructed from building stone as specified in Clause 804.

For culvert headwalls and other small works, the stone shall, unless otherwise specified, be rough dressed. For walls, facing and other exposed works the stone shall unless otherwise specified, be medium chisel-dressed.

Workmanship

The Contractor shall provide and use proper setting out rods for all work.

Stones shall be well soaked before use and the tops of walls shall be kept wet as the work proceeds. The stones shall be properly bonded so that no vertical joint in a course is within 115mm of a joint in the previous course. Alternate courses of walling at angles and intersections shall be carried through the full thickness of the adjoining walls. All perpend, reveals and other angles of the walling shall be built strictly true and square.

The stones shall be bedded, jointed and pointed in mortar 1 to 3 in accordance with Clause 707 with beds and joints 9mm thick flushed up and grouted solid as the work proceeds.

All masonry work shall be cured in accordance with the relevant requirements of Clause 409.

7. MATERIALS

General

The approval in writing or otherwise by the Employer's representative of any materials shall not in any way whatsoever relieve the Contractor from any liability or obligation under the Contract and no claim by the Contractor on account of the failure, insufficiency or unsuitability of any such materials will be entertained.

a) All items shall be suitable for water works purposes and for use with cold water installation and operation being in a tropical climate.

b) All items hereinafter specified shall be to such other Standard or Specification which in the opinion of the Employer's representative provides for a quality of material and workmanship not inferior to the Specification. The Standard or Specification must be submitted to the Employer's representative for approval before commencement of work.

c) All ferrous pipes and fittings shall be coated with a protective paint suitable for use in and transport through a tropical climate.

d) The Contractor shall supply to the Employer a certificate stating that each item supplied has been subjected to the tests hereinafter laid down and conforms in all respects to the said Specification.

e) The Contractor shall provide adequate protection to all piping, flanged items and valves so as to guard effectively against damage in transit and storage and ingress of foreign matter inside the valves.

h) Where applicable the manufacturer's Specification should accompany all offers. The name of the manufacturer must in every case be stated.

j) Where necessary the Contractor shall provide rubber gaskets to comply with SRN 208 and all other bolts, nuts, washers, etc. to undertake jointing at fittings etc.

k) Any articles required under this Contract which are found to be faulty due to a crack, flaw or any other reason or is not in accordance with the Specification stipulated will not be accepted nor will the Employer be liable for any charges in respect of such an article. Where any such rejected article can, in the opinion of the Employer's representative, be rendered usable, the Contractor may deal with it accordingly and include it in the Contract at a price to be mutually agreed. Straight pipes which have been cut will be accepted at the discretion of the Employer's representative, provided the length is not less than 4 meter or two thirds of the standard length whichever is the lesser and will be priced pro-rata.

l) Wherever possible, samples of pipes and fittings shall be submitted for approval of the Employer's representative prior to the Contractor obtaining the total requirements.

Galvanised pipes and specials

All piping shall conform to specification on drawings. The pipes shall be screwed and socketted, coupled or flanged.

All specials shall be of such dimensions as will mate with the piping supplied.

All pipes supplied shall be certified by the manufacturer to have been tested in accordance with the relevant Standard Specification.

Ductile iron and cast iron pipes and specials

All cast iron piping and fittings shall conform to the requirements of SRN 200.

Ductile iron pipes, where required shall be protected as specified by the manufacturer of the pipes and shall be used as recommended by the manufacturer of the pipe.

Where the requirements include for the supply of flexible couplings the Contractor shall submit for approval by the Employer's representative full details of the type of joint offered and a full description of the method of jointing prior to arranging for the delivery of goods on site.

All flexible couplings shall be protected from corrosion by wrapping with Denso paste and tape or by some similar approved material.

The quality of metal used for the manufacture of the pipes shall be of good quality grey cast iron and subject to the various quality control tests as specified in the relevant Standards.

The flanges of straight pipes shall be at right angles to axis of the pipe and the faces of the flanges shall be parallel and machine finished.

The faces of the flanges of fittings shall be at right angles to the directional axis. The bolt holes shall be concentric with the bore and located symmetrically off the centre line.

Steel pipes and specials

All piping shall be plain ended unless otherwise specified and suitable for use with flexible mechanical couplings.

The pipes shall be welded or seamless.

All the pipes shall be internally protected with cement mortar lining. External protection should be by epoxy coating.

All joints shall be of the flexible mechanical type and shall be supplied complete with all bolts, nuts, washers and joint rings as may be required. All metal parts of joints shall be adequately protected with rust-proof paint. The joints shall be protected from corrosion by wrapping with Denso paste and tape or by some similar approved material. All fittings and specials shall be of such dimensions as will mate up with the piping supplied.

Flanged adaptors shall be pieces suitable for connecting a flanged gate valve etc. to the type of piping supplied and shall be supplied complete with all bolts, nuts, washers and joint rings.

The spigot ends of all Tees shall be suitable for connection to the pipework supplied using the aforementioned flexible mechanical joints.

All flanged joints shall be protected from corrosion by wrapping with Denso paste and tape or some similar approved material.

Unplasticised uPVC PIPES

Unplasticised PVC piping shall be in accordance with SRN 300.

The maximum sustained working pressures to which the pipes and fittings will be subjected is based on water at a temperature of 20 degrees centigrade.

The Contractor shall submit full details of the pipes he intends to supply.

The pipes upto and including 40mm diameter can be of a solvent weld type. The pipe shall be supplied with interchangeable sockets preformed at the factory and of such internal diameter that it takes the plain end of the pipe with the same nominal diameter.

The joint shall sustain the end thrust to which the pipe shall be subjected. The Contractor shall supply sufficient quantity of the cleaner and adhesive which shall be required to make the joints with the pipes.

The pipes of 50mm diameter and over shall consist of a grooved socket at one end of the pipe. The socket shall be designed to give a clearance fit on the outside diameter of the parent pipe. The sealing medium which shall seat in the groove shall be a rubber ring.

If the formation of the socket and groove results in the thinning of the original wall thickness of the pipe, it shall be compensated for by shrinking on to the outside of the socket area a reinforcing sleeve of the same material as the pipe. The socket and groove shall incorporate no sharp angles where the stress points are created.

The joint shall take 10% deformation of the spigot at the point where it enters the socket without leakage from the pipe when subjected to the test pressure specified for the pipe. Thermal expansion of the pipe shall be accommodated in the joint. The joint shall be capable of linear deflection upto 3 degrees.

The sealing ring shall be of first grade natural rubber.

The Contractor shall supply sufficient quantity of any lubricant or other material which shall be needed to make the joint which shall be assembled by hand.

The Contractor shall submit full details of the type of joint offered and a full description of the method of jointing.

The fittings shall have the same type of joint as for the pipes to be used. The Contractor shall submit full details of the materials dimensions and test pressures of the fittings offered.

Precautions shall be taken to avoid damage to the pipes and fittings.

In handling and storing the pipes and fittings, every care shall be taken to avoid distortion, flattening, scoring or other damage. The pipes and fittings shall not be allowed to drop or strike objects. Pipe lifting and lowering shall be carried out by approved equipment only.

Special care shall be taken in transit, handling and storage to avoid any damage to the ends.

Pipes and fittings shall be marked at not greater than one metre intervals showing their class and diameter.

Penstocks

Cast iron penstocks shall be all in accordance with SRN 906 and SRN 916. Seating faces shall be gun metal or bronze.

Spindles shall be threaded as necessary and non-rising unless otherwise specified. Spindles shall be of aluminium bronze, manganese bronze and extension spindles may be of mild steel.

Hand wheels shall be of cast iron and words "OPEN" and "SHUT" marked on upper side with appropriate direction arrows.

Flanged JOINTS

All flanges on fittings and pipe-work where flanged connections are required must comply with the requirements of SRN 207 and drilled to NP 16, unless otherwise specified.

Inspection gaskets for flanged joints shall be rubber reinforced with cotton, 3mm. Bolts, washers and nuts for flanged joints shall be of mild steel.

Flexible joints

All flexible couplings (Viking Johnson or other approved type) shall be supplied complete with rubber gaskets, bolts, nuts and washers. All couplings shall be coated with red oxide primer and bituminous composition suitable for use with potable water.

Paints

All priming, undercoating and finishing paints shall be in accordance with SRN 877 or SRN 878 as appropriate.

The painting of all building works shall comprise a special paint recommended for external work while all other paints, plastic emulsion coating etc. are to be of an approved manufacturer. All paints, distempers etc. shall be delivered on site intact in the original drums or tins, and shall be mixed and applied in accordance with the manufacturer's printed directions. The only addition which will be allowed to be made will be liquid thinners, driers etc. supplied by the makers for the purpose.

All surfaces must be thoroughly cleaned down prior to painting and decorating work and no external painting shall be carried out in rainy weather. All paint must be thoroughly well worked on and excess of paint in any coat must be avoided.

All colours will be selected by the Employer's representative from the standard range of colours.

Polyethylene (PE) pipes

Polyethylene High Density pipes shall comply with requirements for testing, storage, handling, laying and backfilling. Contractor shall conform to requirement indicated for PVC pipes..

Contractor shall comply with all instructions issued by the manufacturers and shall submit full details of the type, class, dimensions and test pressures of the brass fittings to the Employer's representative for approval.

Precast concrete units

Precast concrete covers to be precast units for use in the works, whether instructed under the Contract or proposed by the Contractor.

cc) Formwork for Precast Units

Moulds shall be so constructed that they do not suffer distortion or dimensional changes during use and are tight against loss of cement grout or fines from the concrete.

Moulds shall be set up on firm foundations so that no settlement occurs under the weight of the fresh concrete.

Moulds shall be constructed so that units may be removed from them without sustaining any damage.

Release agents used for demoulding shall not stain the concrete or affect its properties in any way.

dd) Reinforcement for Precast Units

Cover to main reinforcement shall be as shown on the drawings, or if not shown shall be not less than 25mm or the diameter of the bar, whichever is the greater. Cover on distribution steel shall not be less than 15mm or the diameter of the bar whichever is the greater.

Bars shall be spaced so that the minimum clear distance between them is the maximum nominal aggregate size plus five millimeter but in any case not less than the diameter of the bars.

Bars may be placed in pairs provided that there are no laps in the paired lengths.

ee) Casting of Units

Concrete for precast units shall comply with the class of concrete specified on the drawings.

The area in which units are cast shall be adequately protected from the weather so that the process is not affected by rain, sun or drying winds.

ff) Curing Precast Unit.

The Contractor shall ensure that units do not suffer any loss of moisture or sudden changes of temperature for at least four days after casting. If a water spray is used for curing, the water shall be at a temperature within 5 degrees centigrade of the temperature of the unit being cured.

gg) Dimensional Tolerances of Precast Units

Units shall be accurately formed to the dimensions shown on the drawings unless closer tolerances are called for by the Employer's representative.

hh) Surface Finish of Precast Units

The formed faces of precast units shall be finished to Class F3 as set out in Clause

505(C) unless another class of finish is specified on the drawings.

Free faces shall be finished to Class UF2 unless another class of finish is specified on the drawings.

Those parts of the unit which are to be joined to other units or to in-situ concrete shall be brushed with a stiff brush before the concrete has fully hardened. Alternatively, if the concrete has been allowed to harden, the surfaces shall be roughened by sand blasting or by the use of a needle gun.

ii) Handling and Storage of Precast Units

Precast units shall be handled in a manner which will not cause damage of any kind and shall be stored on a hard impermeable base.

Units shall be provided with adequate lifting holes or loops, placed in the locations shown on the drawings or agreed by the Employer's representative and they shall be lifted only by such holes or loops. Where it is not possible to provide holes or loops, suitable sling positions shall be indicated in paint on the units.

Units shall be marked indelibly with the reference number and date of casting and shall be stacked on suitable packers which will not damage the concrete or stain the surfaces. Not more than two packers shall be placed under each unit and these shall be located either at the positions of the permanent support points or in positions such that the induced stresses in the unit will be a minimum.

Filter media

The grading of filter media shall be in accordance to the table of grading shown on drawings.

Filter media must be free from fines which would clog the air spaces, and free from dirt, silt and all foreign matter.

The media shall be delivered in clean vehicles and if stored it shall be placed on a clean and firm surface and if it is liable to be contaminated, protected with sheets. Different sizes of media shall be kept strictly separate.

The uniformity coefficient as indicated in the drawings should be adhered to and Contractor to submit samples and carry out sieve analysis, organic content, friability tests, etc. to the satisfaction of the Employer's representative. These tests are to be carried out before the media is placed in filters. All costs arising to be borne by the Contractor.

Submission of samples

As soon as possible after the contract has been awarded, the Contractor shall submit to the Employer's representative a list of the suppliers from whom he proposes to purchase the materials necessary for the execution of the Works. Each supplier must be willing to admit the Employer's representative or his representatives, to his premises during ordinary working hours for the purpose of obtaining samples of the materials in question. Alternatively, if desired by the Employer's representative, the Contractor shall deliver the samples of the materials to the Employer's representative's office without charge.

The information regarding the names of the suppliers may be submitted at different times, as may be convenient, but no source of supply shall be changed without the Employer's representative's prior approval once a supplier, source or material has been approved.

Samples of materials approved will be retained at the Employer's representative's office until the completion of the contract. Samples may be tested to destruction.

All materials delivered to site must be at least equal in all respects to approved samples, otherwise they shall be rejected. No special payment will be made for compliance with clauses specifying tests etc. to ensure quality control etc. unless specifically itemised in Bills of Quantities.

Materials for concrete

jj) General

The Contractor shall submit to the Employer's representative full details of all materials which he proposes to use for making concrete. No concrete shall be placed in the Works until the Employer's representative has approved the materials of which it is composed. Approved materials shall not thereafter be altered or substituted by other materials without the consent of the Employer's representative.

kk) Cement

Cement shall comply with the following Kenya Standards:-

- Ordinary Portland cement.

Cement shall be free flowing and free of lumps. It shall be supplied in the manufacturer's sealed unbroken bags or in bulk. Bagged cement shall be transported in vehicles with effective means of ensuring that it is protected from the weather.

Cement in bags shall be stored in a suitable weatherproof structure of which the interior shall be dry and well ventilated at all times. The floor shall be raised above the surrounding ground level and shall be so constructed that no moisture rises through it.

Each delivery of cement in bags shall be stacked together in one place. The bags shall be closely stacked so as to reduce air circulation but shall not be stacked against an outside wall. If pallets are used, they shall be constructed so that bags are not damaged during handling and stacking. No stack of cement bags shall exceed 3 meter in height.

Cement from broken bags shall not be used in the Works.

Cement in bags shall be used in the order in which it is delivered.

The Contractor shall provide sufficient storage capacity on site to ensure that his anticipated programme or work is not interrupted due to lack of cement.

Cement which has become hardened or lumpy or fails to comply with the Specification in any way shall be removed from the site.

All cement for any one structure shall be from the same source.

Cement should not be stored on site for longer than one month.

Cement which does not comply with the Specification shall not be used in the Works and it shall be disposed off by the Contractor.

The Contractor shall keep full records of all data relevant to the manufacture, delivery, testing and use of all cement used in the Works and shall provide the Employer's representative with two copies thereof.

ll) Fine Aggregate

Fine aggregate shall be clean, hard and durable and shall be natural sand, crushed

gravel sand or crushed rock sand. All the material shall pass through a 5mm standard sieve.

The fine aggregate shall not contain iron pyrites or iron oxides. It shall not contain mica, shale, coal or
Other properties shall be as set out below:

Soundness: After five cycles of the test in AASHO T104 or an approved equivalent, the aggregate shall not show a weight loss of more than 10 per cent.

mm) Coarse aggregate

Coarse aggregate shall be clean, hard and durable crushed rock, crushed gravel or natural gravel complying with the requirements. The material shall not contain any iron pyrites, iron oxides, flaky or laminated material, hollow shells, coal or other soft or porous material, or organic matter
Other properties shall be as set out below:-

The proportion of clay, silt and other impurities passing a 75 micron standard sieve shall not be more than one per cent by weight.

The content of hollow and flat shells shall be such as will not adversely affect the concrete quality when tested as set out in SRN 117. The total content of aggregate shall not be more than the following:

40mm nominal size and above	2% of dry weight
20mm nominal size	5% of dry weight
10mm nominal size	15% of dry weight

Chlorides soluble in a 10 per cent solution by weight of nitric acid shall not exceed 0.03 per cent by weight, expressed as chloride ion when tested as set out in SRN 107 but subject also to the further restriction under the note on total chloride content hereunder. Sulphates soluble in a 10 per cent solution by weight of hydrochloric acid shall not exceed 0.4 per cent by weight expressed as SO₃ when tested as set out in SRN 601 subject also to the further restriction given in the note on total sulphate content hereunder.

Soundness: After 5 cycles of the test in AASHO T104, the aggregate shall not show a weight loss of more than 12 per cent.

When tested in accordance with test C289 of the American Society for Testing of Materials (ASTM), the aggregate shall be non-reactive.

Flakiness Index when tested in accordance with SRN 113 shall be as set out hereunder:

For 40mm stone and above, not more than 40
For 20mm stone and below, not more than 35

If the Flakiness Index of the coarse aggregate varies by more than five units from the average value of the aggregate used in the approved trial mix, then a new set of trial mixes shall be carried out if the workability of the mixes has been adversely affected by such variation.

Impact value: Not more than 45 per cent when tested in accordance with SRN 107.

Ten per cent fines value: Not less than 50kN when tested in accordance with SRN 107.

Shrinkage: When mixed with other ingredients in the approved proportions for concrete and tested as set out in SRN 117, the shrinkage factor shall not exceed 0.05

per cent.

Organic impurities: If the test for presence of organic impurities in aggregates shows that more than a trace of organic impurities is present, the aggregate shall not be used in the Works unless the Contractor can show by tests on finished concrete as set out in SRN 117 that the presence of organic impurities does not adversely affect the properties of the concrete.

Water absorption: The aggregate shall not have a water absorption of more than 2.5 per cent when tested as set out in SRN 112.

Aggregate Crushing Value (ACV): Not more than 35 per cent.

Los Angeles Abrasion (LAA): Not more than 50 per cent.

NOTE: Total chloride and sulphate content:-

The total chloride content, expressed as chloride ion, arising from all ingredients in a mix including cement, water and admixtures shall not exceed the following limits, expressed as a percentage of the weight of cement in the mix:-

For pre-stressed concrete, steam cured concrete or concrete containing sulphate resisting or super sulphated cement: 0.05 per cent.

For any other reinforced concrete: 0.3 per cent in 95 per cent of all test results provided no result is more than 0.5 per cent.

The total sulphate content expressed as SO_3 of all the ingredients in a mix including cement, water and admixtures shall not exceed 0.4 per cent by weight of the aggregate or
per cent of the weight of cement in the mix, whichever is the

lesser. nn) Testing Aggregates

a) Acceptance testing

The Contractor shall deliver to the Employer's representative samples containing not less than 50 kg of any aggregate which he proposes to use in the Works and shall supply such further

Tests to determine compliance of the aggregates with the requirements of sub-clause 724(c) and (d) shall be carried out by the Contractor in a laboratory acceptable to the Employer's representative. If the tested materials fail to comply with the Specification, further tests shall be made in the presence of the Contractor and the Employer's representative and acceptance of the material shall be based on such tests.

A material shall be accepted if not less than three consecutive sets of test results show compliance with the Specification.

b) Compliance testing

The Contractor shall carry out routine testing of aggregates for compliance with the Specification during the period that concrete is being produced for the Works. The tests set out below shall be performed on aggregates from each separate source on the basis of one set of tests for each day on which aggregates are delivered to site provided that no set of tests shall represent more than 250 tonnes of fine aggregate nor more than 500 tonnes of coarse aggregate, and provided also that the aggregates are of uniform quality. If the aggregate from any source is variable, the frequency of testing shall be increased as instructed by the Employer's representative.

-
- Silt and clay contents SRN 107
 - Moisture content SRN 107
 - Check on organic impurities

In addition to the above routine tests, the Contractor shall carry out the following tests at the frequencies stated:

Moisture content: As frequently as may be required in order to control the water content of the concrete as required by the Specification.

Chloride content: As frequently as may be required to ensure that the proportion of chlorides in the aggregates does not exceed the limit stated in the Specification.

c) Delivery and storage of aggregates

Aggregates shall be delivered to site in clean and suitable vehicles. Different types or sizes of aggregate shall not be delivered in one vehicle.

Each type or size of aggregate shall be stored in a separate bin or compartment having a base such that contamination of the aggregate is prevented. Dividing walls between bins shall be substantial and continuous so that no mixing of types or sizes occurs.

The storage of aggregates shall be arranged so that as far as possible rapid drying out in hot weather is prevented in order to avoid sudden fluctuations in water content. Storage of fine aggregates shall be arranged so that they can drain sufficiently before use in order to prevent fluctuations in water content of the concrete.

g) Water for concrete and mortar

Sea water or brackish water containing more than 1,000 ppm chloride ion or 2,000 ppm sulphate ion shall not be used for mixing or curing concrete.

The Contractor shall carry out tests in accordance with SRN 114 to establish compliance with the Specification.

Building stone

All building stone shall be capable of withstanding when wet a crushing stress of 1.4 kg./sq.mm. The source of stone shall be approved by the Employer's representative and stone supplied there from shall be free from Magadi, overburden, mudstone, cracks, sandholes, veins, laminations or other imperfections.

The stone shall be chisel dressed into true rectangular blocks, with each surface even and at right angles to all adjoining surfaces, to the size specified. For exposed stone-work the maximum permissible variation of any of the specified dimensions shall be 6mm provided that cut stone, supplied as 'rock face' stone may be hammer dressed on one face only, or on one face and one end, if in other respects it conforms with this specification. Stones shorter than 375mm will not be accepted.

Murram

Murram shall be from an approved source quarried so as to exclude vegetable matter, loam, top soil or clay. The California Bearing Ratio of the murram, as determined for a sample compacted to maximum density (as defined under SRN 601) and allowed to soak in water for four days, shall not be less than 30%. This C.B.R. is a guide to quality only and the compaction in the work will be judged by density.

Cement mortar

Cement mortar shall consist of proportions by volume as specified of Portland Cement and natural sand or crushed natural stone or a combination of both as specified: Building Sands from Natural Sources. The constituent materials shall be

accurately gauged and mixed in an approved manner.

Cement mortar shall be made in small quantities only as and when required, and any mortar which has begun to set or which has been mixed for a period of more than one hour shall be rejected.

Cement-lime mortar

Cement-lime mortar shall consist of Portland Cement, hydrated lime and natural sand or crushed natural stone or a combination of both, as specified for cement mortar in Clause 707. The constituent materials shall be accurately gauged and mixed by volume in an approved manner in the proportions specified.

Cement-lime mortar shall be made only in small quantities as and when required. Any mortar which has begun to set or which has been mixed for a period of more than two hours shall be rejected.

Cement grout

Cement grout shall consist of Portland Cement and water mixed in the proportion of one part by volume of cement and one and a half parts by volume of water. The grout shall be used within one hour of mixing.

All stones shall be protected from damage during transport and erection by means of cement slurry coatings or by other approved methods.

Reinforcement for concrete

Reinforcement which shall comply with the following Standards, covers plain and deformed bar reinforcement and steel fabric to be cast into concrete in any part of the Works but does not include prestressing tendons or any other embedded steel.

- SRN 126 for hot rolled plain bar and high yield deformed bar
- SRN 127 for cold worked steel bar
- SRN 128 for steel mesh fabric

All reinforcement shall be from an approved manufacturer and, if required by the Employer's representative, the Contractor shall submit a test certificate from the manufacturer.

All reinforcement for use in the Works shall be tested for compliance with the appropriate British Standard in a laboratory acceptable to the Employer's representative and two copies of each test certificate shall be supplied to the Employer's representative. The frequency of testing shall be as set out in the relevant Standard.

In addition to the testing requirements described above, the Contractor shall carry out additional tests as instructed by the Employer's representative.

Any reinforcement which does not comply with the Specification shall be removed from site.

All reinforcement shall be delivered to site either in straight lengths or cut and bent. No reinforcement shall be accepted in long lengths which have been transported bent over double.

Any reinforcement which is likely to remain in storage for a long period shall be protected from the weather so as to avoid corrosion and pitting. All reinforcement which has become corroded or pitted to an extent which, in the opinion of the Employer's representative, will affect its properties shall either be removed from site or may be tested for compliance with the appropriate Standard at the Contractor's expense.

Structural steel for welded work

Structural steel for riveted and welded work shall comply with the requirements of SRN 125 : Structural Steel, SRN 126 : The Use of Structural Steel in Building and for Welded Work, SRN 125 : High Yield Stress and High Tensile Structural Steel, High Tensile (Fusion Welding Quality) Structural Steel for Bridges, etc. and General Building Construction.

Waterproof underlay

Waterproof underlay shall consist of either waterproof paper complying with SRN 856 : Waterproof Building Paper, containing approved fibrous reinforcement, or 500 gauge polythene sheeting as stated in the Bill of Quantities.

Concrete drain invert blocks

Precast concrete invert blocks shall be manufactured to the detail drawings supplied from concrete Class 20/10 as specified in Table 4.2 using maximum 12mm size aggregates. If required, cube test certificates shall be supplied by the manufacturer.

Concrete slabs for open drains

Precast concrete slabs for lining open drains shall be manufactured to the detail drawings supplied from concrete Class 20/10 as specified in Table 4.2 using maximum 12mm size aggregates. If required.

Manhole covers and frames

Manhole covers and frames shall be basically heavy duty PVC covers

Manhole step irons

Step irons of general purpose type shall comply in all respects with SRN 845 : Malleable Step Irons.

Timber

Timber shall be sound, well seasoned and entirely free from worm, beetle, warps, shakes, splits, and all forms of rot and deadwood. Where required, all timber shall be treated with creosote, as specified in SRN 872 : Coal Tar Creosote for the Preservation of Timber or an alternative approved timber preservative.

8. Workmanship

Handling of pipes and fittings

The Contractor shall exercise care in the handling of all pipes, specials, valves etc., to prevent damage to the structure surfaces and to the ends of the pipes.

Loading and unloading

Normally loading and unloading of small diameter pipes and fittings can be undertaken by hand; where mechanical means are used care should be exercised to ensure that the handling methods do not damage the pipes and fittings.

Storage

The Contractor shall comply with the manufacturer's specification regarding the storage of pipes, fittings and valves. Where storage dumps are to be provided along the route of the pipeline, these will be subject to the Employer's representative's approval. The cost of so providing shall be borne by the Contractor and deemed to be covered by his rates in the Bill of Quantities.

Transport

The Contractor shall provide such transport arrangements as will effectively cater for the lengths of pipes provided and the material of the piping. Adequate support

shall be provided so as to ensure that the piping and fittings are not subject to excessive movement.

Examination of pipes and fittings

The Contractor shall examine all pipes, valves, fittings and other materials to ascertain that they are in perfectly sound condition before commencing to lay the pipes, valves etc.

Method of excavation

The Contractor is deemed to have covered in his excavation rates all the work that is necessary in order to comply with the provisions of the Specifications in general and this Clause in particular.

a) The Contractor shall excavate the pipe trenches in the line and to the depths indicated on drawings or as indicated by the Employer's representative. Except where otherwise indicated on the drawings or directed by the Employer's representative, it is intended that the trench shall be excavated to such a depth as will allow of a minimum cover of 600mm over the top of the barrel of the pipe when laid. All trenches shall be excavated in open cuttings and for trenching to uPVC piping, shall not be opened too far in advance of pipe laying.

b) For the purpose of measurement, the width of trench shall be taken as the nominated width for the particular size of sewer, irrespective of the width of trench the Contractor may choose to excavate.

Nominated trench width for:

75mm main	0.5m
100mm main	0.6m
150mm main	0.6m
200mm main	0.6m
225mm main	0.6m

For two or more pipes in the same trench the nominated width shall be the distance between the centres of the outer pipes plus the internal radii of the outer pipes plus 400mm.

c) Where the trench passes through grassland, arable land or gardens, whether enclosed or otherwise, the turf, if any, shall be carefully pared off and stacked, and the productive soil shall be carefully removed for a width of 600mm greater than the nominated trench width, or equal to the overall width of track of excavating machine, whichever is greater, and laid aside to be subsequently used in reinstating the surface of the ground after the trench has been refilled.

K2d) The bottom of the trench shall be properly trimmed off, and all low places or irregularities shall be levelled up with fine material. Where rock or large stones are encountered, they shall be cut down to a depth of at least 100mm below the level at which the bottoms of the barrel of the pipes or flanges are to be laid, and covered to a like depth with fine material, so as to form a fine and even bed for the pipes. The bottom of trenches to accommodate uPVC piping shall be hardened by tamping in gravel or broken stone in all soft spots. The bedding shall consist of soil which can be properly compacted to provide support for the pipe and to comply with Clause 809 b).

g) The Contractor shall, wherever necessary, by means of timbering or otherwise, support the sides of the trench so as to make them thoroughly secure, and afford adequate support to adjoining roads, land, buildings and property, during the whole time the trench remains open and shall remove such timbering when the trench has been backfilled. The cost of such timbering or other work shall be deemed to be included in the rates for excavation. In case the Contractor is instructed by the Employer's representative to leave any portion of such timber in position after backfilling the trench, he will be paid for it accordingly.

h) The clear width inside the timbering shall be at least 150mm in excess of the external diameter of the pipe being laid, in order to allow it to be freely lowered into position, in the trench without damage to the external protection.

i) Should the excavation be taken out to a greater depth than is specified the bottom shall be made good to the correct level with Class 15/20 concrete or other material approved by the Employer's representative. No payment shall be made for any over excavation carried out by the Contractor nor for the cost of filling up to required levels.

j) If a mechanical excavator is used by the Contractor, he shall indemnify the Employer against all claims for damage which in the opinion of the Employer's representative, may be caused by the use of this plant.

Main laying

a) Mains shall be laid in straight lines and/or smooth curves as indicated on the drawings. The vertical profile of the pipe shall be to even gradients. Any pipes not so laid shall be removed if so directed by the Employer's representative, and re-laid in proper manner at the Contractor's expense.

In laying the pipes and specials care shall be taken not to damage the protective linings and the pipes shall be handled with tackle if so directed by the Employer's representative.

The pipes and specials shall be checked for flaws before they are lowered into the trench. After the pipes or specials have been checked they shall be cleaned and set to proper gradient and line so that there is a continuous rise from each washout to air valve.

When laying uPVC pipes, final connection at any fixed joints shall be deferred until the majority of the pipeline has been covered with backfill.

b) Large diameter curves to mains shall wherever possible be formed by allowing for deflection at flexible joints, not exceeding 3 degrees, or as specified by the manufacturers.

c) In jointing of the pipes and specials the Contractor shall comply with the standards adopted for the various types of joints as specified.

d) In laying pipes and specials with flanged joints, flanges shall be brought together and bolted with the faces absolutely parallel. A rubber jointing gasket ring 3mm thick shall be used in each flange joint and one washer with and not provided for each bolt.

The bolts shall be tightened up gradually and equally in the customary manner in order to distribute the stress evenly over the flange. If it is found necessary to deviate slightly from the normal run of the flanged piping, the deflection shall be obtained by means of a bevelled gun metal ring washer between the flanges.

f) The Contractor shall, subject to approval of the Employer's representative, cut pipes to such lengths as directed. Pipes should be cut off clean and square with the axis. Cuts should be made with an approved cutting device dependant on the type of pipe specified. Ends of pipes should be tapered by means approved by the Employer's representative if mechanical joints are to be used.

g) Equipment for tapping off the mains under pressure may be employed in the making of service or branch connections. The Contractor is required to choose a suitable method for fixing of the ferrule to the type of pipe specified, to the Employer's representative's approval.

Backfilling of trench

a) When a section of the main has been jointed, the ends shall be temporarily closed with caps, plugs or flanges to prevent ingress of foreign matter into the pipe to the satisfaction of the Employer's representative. The trench shall be properly backfilled and rammed for its whole length so that the soil cover to the main shall not be less than 600mm except at joint holes which shall be kept clear of all backfilling, if necessary, by the use of timbering, so that each joint is left fully exposed for the Employer's representative's inspection. Special care shall be exercised when using surround to A.C. and uPVC pipes which shall be free from any stones and well compacted in layers to not less than 100mm above the crown of the pipe.

b) The Contractor's attention is drawn to the special requirements for bedding and side- fill to uPVC pipes. Clay should not be used. Soils which are of a granular nature and provide adequate support after compaction shall be used. If unavailable from excavated material the Contractor should provide suitable material for which an item in the Bill has been included.

With flexible pipes it is important that the sidefill should be firmly compacted between the pipe and the soil sides of the trench. The bedding material shall be placed in 75mm layers up to the crown of the pipe with adequate compaction and then to a minimum height of 100mm or two thirds of the pipe diameter. The progress of filling and tamping should proceed equally on either side of the pipe so as to maintain an equal pressure on both sides.

c) Where a main is laid across a road or is in such a position as to interfere seriously with the normal use of the road, the Contractor may, with the consent of the Employer's representative and at his own risk, fill such holes as may be necessary. Due consideration is to be given to compaction of section of the trench across the road to prevent un- due settlement. In the event of damage at this section the Contractor is required to re- excavate and repair the pipeline all at his own expense.

Testing of water retaining structures

As soon as possible after completion of water retaining structures viz. storage reservoirs etc. they shall be tested for water retention by filling to the normal maximum level with water at a uniform rate of not greater than 2m in 24 hours.

When first filled, the water level should be maintained by adding of further water for a stabilizing period while absorption and autogenous healing take place. This period may be 7 days after which the level of the water surface should be recorded at 24 hour intervals for a test period of 7 days. The structure shall be considered satisfactory if, during this period the total permissible drop in level, after making due allowance for rainfall and evaporation, should not exceed 1/500th of the average water depth of the full tank, 10mm or another specified amount all in accordance with SRN 102. Water used in testing the structures shall be supplied by the Contractor.

This test shall be carried out before any backfilling has taken place.

In the event of any water retaining structures failing to pass the test, the Contractor shall make good and re-test at his own expense.
water.

9. DRAINS, SEWERS AND MANHOLES

Excavation for drains, sewers and manholes

The ground shall be excavated to the lines and depths shown on the drawings or to such other lines and depths as the Employer's representative may direct. Excavations taken out to a greater depth than is necessary shall be filled to the required level with approved material as specified for the pipe bed at the Contractor's own cost. Trenches shall be of sufficient width to enable the pipes to be properly laid and jointed. In case of pipes of greater diameter than 300mm, the width of trench shall be external diameter of pipe, plus 400mm. When any excavation has been taken out and

trimmed to the levels and dimensions shown on the drawings or as directed by the Employer's representative, the Employer's representative shall be informed accordingly so that he may inspect the completed trench and no excavation shall be filled in or covered with concrete until it has been so inspected and the Contractor has been authorised to proceed with the work. All surplus materials from such excavations not required for refilling shall be carted away to tips, or otherwise disposed of, as directed. All excavations shall be kept dry, and all bailing and pumping, timbering, shoring and supporting of sides that may be required, and any refilling, ramming and disposal of surplus materials necessary in carrying out the excavations and backfilling of trenches shall be taken to provide a solid and even bed for barrels of the pipes and, where a concrete bed is not specified, the floor of the trench shall be properly shaped to receive the sockets and the backfill must be thoroughly rammed along the sides of the pipe.

The rate of excavation in the Bill of Quantities shall include for keeping trenches dry and for all bailing, pumping, timbering, shoring and supporting of sides that may be required.

Supports for pits, trenches and other excavations

The sides of pits, trenches and other excavations shall, where necessary, be adequately supported to the satisfaction of the Employer's representative, and all such excavations shall be of sizes sufficient to enable the pipes and bedding to be laid accurately, and proper refilling and compacting to be carried out.

The Contractor shall take all precautions necessary for the safety of adjoining structures and building by shoring, opening in short lengths or otherwise, during the time the trenches are open.

Rock cutting in trenches for pipes and other excavations

Where solid rock is met within trenches and other excavations, it shall be cut out to a depth of 100mm below the intended level of the bottom of the pipes, and replaced with 100mm of approved material as specified. In measuring such rock excavation the Contractor will be allowed a width of 400mm more than the external diameter of the pipes to a level of 100mm below the bottom of the pipes. The price inserted in the Bill of Quantities shall be held to cover all expenses in connection with excavating the rock, backfilling after laying of pipes and disposing of surplus material as directed by the Employer's representative.

Water in trenches for pipelines and other excavations

Trenches and other excavations shall be kept free from water at all times during construction of works until, in the opinion of the Employer's representative, any concrete or other works therein are sufficiently set, and the Contractor shall construct any sumps or temporary drains that the Employer's representative may deem necessary.

The Contractor shall be responsible for the removal and disposal of all water entering the excavations from whatever source and shall deal with and dispose of such water in a manner approved by the Employer's representative so as to ensure that excavations are kept dry while ensuring that the disposal of this water does not cause a nuisance to adjacent plot holders or works.

The Contractor shall provide all plant, labour and materials required for such work and all costs incurred shall be deemed to be included in his rates for excavation.

Pipes laid with open joints

O.G. porous concrete pipes as specified in Clause 719 shall be laid unjointed with a space of 12mm between the spigot and the inner end of the socket.

All pipes shall be packed and surrounded as directed by the Employer's

representative with approved broken stone, sand or gravel aggregate, to the gradings as shown on the drawings or stated in the Bill of Quantities. The prices inserted in the Bill of Quantities shall include the trench excavation, providing and laying pipes, supplying and placing graded packing material, refilling trench and disposing of surplus all as specified.

Cast iron pipes

Cast iron pipes and special castings, shall be as specified in Clause 721 and shall be supplied, laid and jointed with lead wool properly caulked to form perfectly uniform and watertight joints, and when laid and jointed they shall be true to line and level.

Where cast iron pipe drains are laid on unstable ground or ground which is likely to settle appreciably over a period of years they shall be pointed by means of an approved self adjusting or screwed gland joint as directed by the Employer's representative.

Drains to be left clean on completion

On completion, all drains, manholes, etc. shall be flushed from end to end with water from an approved source and left clean and free from obstructions.

Refilling trenches

Trenches shall be refilled with suitable excavated material of 100mm surround but not before the work has been measured and approved by the Employer's representative. For pipes which are not surrounded with concrete, the first layer of filling material shall be free from stones and shall not be thrown directly on to the pipes, but shall be placed and packed with care all round them. All filling shall be deposited and compacted in layers, not exceeding 225mm loose depth, to a dry density not less than that of the adjoining soil. The last 450mm of filling must be returned in the order in which it has been removed. Timber and framing shall be withdrawn ahead of the layer to be compacted, care being taken to keep the sides of the trenches solid and to fill all the spaces left by the withdrawn timber.

Connections of existing sewers and drains

Where shown on the drawings, existing sewers and drains shall be properly extended, connected and jointed to new sewers, culverts, drains or channels. All such connections shall be made during the construction of the main sewer, drain or other work and a record of their positions kept for future use or reference. Where pipe connections are made to a sewer, stone pitched or lined channel, the pipes shall be well and tightly built into the concrete, or masonry work and be so placed as to discharge in the direction of the main sewer, drain or channel and with the end of the pipe carefully cut to the necessary angle. Where the connections are between pipe sewers or drains, special connecting pipes as shown on the drawings shall be supplied and be truly laid and properly jointed.

Manholes and inspection chambers

Manholes and inspection chambers shall be constructed in accordance with the drawings and in the position shown on the drawings or directed by the Employer's representative. Foundation slabs shall consist of concrete of the appropriate classes as specified on drawings. The side walls shall consist of similar concrete or building stone as specified in Clause 703 in accordance with the drawings.

The side walls shall be fair faced or rendered internally as specified on drawings. They shall be brought up vertically to receive a precast slab formed of concrete of the appropriate classes specified and reinforced all as shown on the drawings. Cast iron manhole covers and frames as specified in Clause 726 shall be provided and frames shall be bedded in cement mortar 1 to 3 and so set that the tops of the covers shall be flush at all points with surrounding surface of the footway, verge or carriageway, as the case may be. Any slight adjustment of the slab level which may be necessary to accomplish this shall be effected by topping the side walls with concrete integral with the slab.

If required, half channel pipes, bends and junctions as specified in Clause 718 and Clause 719 shall be laid and bedded in cement mortar 1 to 3 to the required lines and levels, and both sides of the channel pipes shall be benched up with concrete of the appropriate class and finished smooth to the slopes and levels as shown on the drawings or directed by the Employer's representative. The ends of all pipes shall be neatly built in and finished flush with cement mortar 1 to 3. Where the depth of the invert exceeds 1 metre below the finished surface of the carriageway or the adjacent ground, iron steps as specified in Clause 730 shall be built in with alternate steps in line vertically and with such additional hand irons as the Employer's representative may direct.

All manholes when completed shall be watertight and to the satisfaction of the Employer's representative. The prices inserted in the Bill of Quantities shall include for excavation, provision of all materials, construction, refilling and disposal of surplus.

Precast concrete manholes

Precast concrete manholes as specified in Clause 728 shall be supplied and laid generally in accordance with Clause 1011 and the drawings.

Completion of drainage works

All sub-soil and surface water drains shall be completed in advance of the construction.

Testing of jointed pipes and manholes

Sealed jointed drains, up to and including 600mm diameter shall be tested in sections (e.g. between manholes) by filling with water under a head of not less than 1 metre. Drains found to be water-tight after a period of 30 minutes will be passed as satisfactory but the water must be retained in the pipes until a depth of at least 450mm of filling has been deposited and compacted on top thereof. Drains failing to stand the test shall be taken out and the pipes re-laid and re-jointed until completely water-tight.

Drains exceeding 600mm in diameter shall be tested by means of a smoke test before they are covered up. Both ends of the lengths of drain to be tested shall be sealed to the satisfaction of the Employer's representative, and smoke shall then be pumped in- to the section from an approved machine. Should any joint in the section show an escape of smoke, the section shall be taken out and the pipes re-laid and re-jointed until there is no further escape of smoke.

Should the Employer's representative so direct, manholes shall be tested by completely filling with water, and there shall be no appreciable loss over a period of 2 hours.

On completion of the works, or at suitable intervals during construction, infiltration tests will be carried out. The permissible amount of infiltration shall be 1 litre per hour per linear metre of nominal internal diameter.

The Contractor shall provide all labour and apparatus for the above tests.

All testing will be done in accordance with the procedure of the British Standard Code.

Pipes with rubber ring joints

Rubber rings complying with SRN 308 will be provided by the Contractor. They will be laid in the socket and the pipes then jointed as specified. The jointing of pipes shall be carried out in accordance with manufacturer's instructions and in conformity with any modifications proposed by the Employer's representative.

Laying, jointing and backfilling for flexible jointed pipes

The Contractor shall ensure that any hard spots and loose stones are removed from

the formation prior to laying of bedding materials. The Contractor shall lay a bed of thickness 100mm consisting of granular material i.e. sand, gravel, or approved soil of friable nature.

After laying of pipes the Contractor shall lay bedding material on the sides of the pipe compacted by tamping into soffit of sewer.

After completion of this operation the Contractor shall lay the bedding material on top of the pipe in 150mm layers to a thickness of 300mm. The material is to be compacted by tamping. However, precautions are to be taken to avoid excessive tamping on top of the pipe. The remaining trench excavation is to be backfilled to comply with Clause 1009 of specification.

The pipes shall be laid with flexible ring seal joints provided that solvent cement joints could be used for fittings where necessary subject to the approval of the Employer's representative. Pipes and fittings shall be checked for deformities prior to laying. Deformed pipes and fittings shall not be accepted.

oo) Flexible rubber ring joints

The Contractor shall ensure that the spigot end is free from grit, dust or dirt and sealing rings should be seated evenly in the socket groove. Pipe lengths and fittings are supplied with a chamfer on the spigot. Where pipes are to be cut or are supplied without a chamfer on the spigot end the Contractor shall ensure that the pipe is cut square and then form a chamfer on the spigot end with a medium file to an angle of 15 degrees. Remove saw flashing by scraping with a pen-knife.

Debris screens

Where shown on the Drawings, the Contractor shall fabricate and install debris screens across the full width of the drain channel cross-section. The screens shall be fabricated using galvanised mild steel complying with BS 729. They shall be mounted on R.C. supports and incorporate a safe access platform to facilitate manual clearing of debris as shown on the Drawings.

10. MISCELLANEOUS

10.1 General

The Contractor is referred to the drawings as to the general character of the works and he shall allow in his rates for any extra costs he may consider incurred by reason of the work being in detached positions, in small quantities, difficulty of access or for any other cause. He should also make due allowance for specialist installations taking place during the currency of this contract.

This section of the Specification refers to miscellaneous items. Clauses elsewhere in the Specification shall also be followed where relevant.

1.1.

Precast lintels

All precast items shall be marked with the date of casting and shall not be built into the works until they have matured for 28 days. Ends of bar reinforcement shall be hooked or bent as required. The cover for reinforcement shall be 25mm from internal faces and 38mm from external exposed faces. The 'top' of lintels shall be numbered for identification.

Lintels shall have timber or pre-formed inserts cast in for fixing metal windows where required and shall have fair face finish on all surfaces exposed to view and hacked surfaces where plastered.

Damp-proof course (d.p.c.)

Hessian based metal cored bitumen for damp-proof courses shall be lead cored,

complying with B.S. 743 paragraph 4, type D, weighing not less than 4.4 kg. per square metre. Damp-proof course shall be bedded horizontally in mortar as for blockwork with 115mm laps in length and full laps at angles.

Plywood

Plywood generally shall comply with B.S. 1455. That from sources not included in B.S. 1455 shall be of corresponding grades of veneers and types of bonding. Plywood for flush doors shall be Grade I Mvuli veneered.

Doors

Internal doors shall be hardwood framed solid cored flush doors constructed in accordance with B.S. 459 Part 3, faced both sides with 3mm thick Mvuli veneered plywood and lipped all round with matching hardwood lipping. Moisture content at delivery shall be 12% (+ or - 2%).

Frames and linings

Door frames and linings shall be Class 1 Mvuli mortice and tenon jointed at angles. Sub-frames for internal doors shall be Class 1 Mvuli tongued at angles.

Architraves and stops

Architraves and stops shall be Class 1 Mvuli matching to the frames and linings.

Ironmongery

All ironmongery shall be obtained from a source approved by the Employer's representative's Representative. Samples shall be submitted before ordering and the articles ordered shall match up with the approved samples. Screws of a like metal shall be used for all fittings.

Fixing joinery

Doors shall be hung on one or one and a half pairs of butt hinges to give a maximum even tolerance of 2mm all round.

Sub-frames shall be fixed to blockwork with three fixing clamps per side and one dowel let 50mm into the floor and 50mm into the foot of each leg. Linings shall be fixed after completion of other finishings by means of screwing and pelling to sub-frames with matching hardwood pellites. Architraves and stops shall be pinned on, heads punched and filled with tinted filler.

Fixing ironmongery

The rates for supplying and fixing ironmongery shall include for all sinking, cutting, boring, mortising etc., making good, replacing damaged screws, oiling, adjusting and leaving in good working order and for mastering all keys.

Bolts and nuts

Bolts and nuts shall comply with the relevant requirements of the British Standards as set out below:-

Black Hexagon Bolts, Screws and Nuts	B.S. 4190, Grade 4.6
Metal Washers for General Purpose	B.S. 4320
Black Cup and Countersunk Head Bolts and Screws, with Nuts	B.S. 4993

Structural steelwork

The whole of the structural steelwork and testing shall comply with the relevant clauses of B.S. 449. The Contractor shall include for the preparation of all shop details from the drawings supplied by the Employer's representative. All such details shall be approved in writing by the Employer's representative before the work is put in hand.

Every drawing shall show the number and sizes of all rivets and bolts, complete details of welds, type of electrodes, welding procedure, whether the welds are to be made in the shop or elsewhere and any other relevant information. The Contractor shall be responsible for the accuracy of his shop details and for shop fittings and site connections.

The Contractor shall take the dimensions from the structure and he shall verify all dimensions given on the drawings before the work is put in hand.

Any damage to materials on the site due to inadequate precautions being taken during the erection of the steelwork shall be made good to the satisfaction of the Employer's representative's Representative at the Contractor's expense.

The fabrication and erection of the steelwork shall be carried out in accordance with Part 5 of B.S. 449.

Galvanised work

Iron and steel, where galvanised, shall comply with B.S. 729, entirely coated with zinc after fabrication by complete immersion in a zinc bath in one operation and all excess carefully removed. The finished surface shall be clean and uniform.

Electrical installation

The electrical installations will be carried out by Licensed Electrician and complying with the following:-

- a) Regulations for Electrical Equipment of Buildings issued by the Institution of Electrical Employer's representatives.
- b) Electric Power Act.
- c) The K.P.&L. Co.'s Bye-Laws.
- d) Relevant current British Standards and Codes of Practice.
- e) All the relevant clauses in this Specification, particularly the clauses in Sections 13 and 14.

11. PLUMBING INSTALLATION

Water authorities regulations

The internal plumbing work shall be carried out to the satisfaction of and in accordance with the regulations of the local Water Authority.

Rainwater installations

Rainwater installation shall be in grey PVC pipework with 'O' ring joints.

Testing plumber's work

The plumbing work and sanitary fittings shall be tested at such times as the Employer's representative's Representative shall direct and to his entire satisfaction. Gutters and rainwater pipes shall be tested with water to satisfy the Employer's representative's Representative that gutters are to correct falls, pipes are unobstructed and joints are sound.

Setting out

The positions of all pipe runs, including joints and connections, shall be agreed with the Employer's representative's Representative before work is commenced.

Plastic pipes, fittings and accessories

uPVC soil and ventilating pipes and fittings shall comply with B.S. 4514. Waste pipes

and fittings shall be modified unplasticised polyvinyl chloride (MuPVC). Waste traps shall comply with B.S. 3943. Balloon gratings shall be plastic coated steel wire.

Pipework generally

Pipes shall be in the maximum lengths possible to avoid unnecessary jointing and fixed to sufficient falls to prevent air locks and to enable the system to be drained down.

Cisterns

Storage cisterns and break feed cisterns shall be galvanised steel cisterns complying with B.S. 417, Grade A.

Sanitary fittings

Sanitary fittings shall be manufactured from glazed vitreous china complying with the requirements of B.S. 3402. They shall be supplied by an approved firm and shall pass the requirements of the local Water Authority.

12. PLASTERWORK AND OTHER FLOOR, WALL AND CEILING FINISHINGS

General

All branded materials shall be delivered in the manufacturer's packages bearing the manufacturer's name and the name of the material concerned. Cement, lime, plaster etc., shall be stored separately off the ground in dry conditions. All surfaces shall be properly prepared for plastering, rendering and screeding and brushed or cleaned free from dust and all traces of efflorescence and contamination removed. Concrete surfaces shall be thoroughly cleaned free from all traces of mould oil or other formwork coatings and hacked to provide a key.

Surface to receive plastering, rendering, screeding etc. shall be wetted sufficiently in advance to ensure the correct conditions for adhesion. Undercoats shall be thoroughly scratched to allow for keying and allowed to dry sufficiently before application of further coats. Dubbing out shall be in the same mix as the subsequent coat and shall not exceed 20mm in thickness in one application.

Cement

Cement shall be Ordinary Portland Cement and shall comply with KS 02-21. White and/or an equivalent approved coloured cements shall comply with KS 02-21 and shall be obtained from an approved manufacturer.

Sands

Sand for cement and lime shall comply with B.S. 1199, Table 1 for undercoats and Table 2 for finishing coats. Sand for floor screeds shall comply with B.S. 1199, Table 1.

Lime putty

Lime putty shall be prepared from hydrated lime complying with B.S. 890, Table 2. Hydrated lime shall be added to water, stirred to a creamy consistency and left to mature for at least sixteen hours before use. Alternatively, ready slaked lime may be obtained from an approved manufacturer. The lime putty shall be protected from drying out.

Plasticisers

Plasticisers shall be of the resin type and shall be used only with the approval of the Employer's representative's Representative in accordance with the manufacturer's instructions.

Water proofers

Water proofers shall be approved integral water proofers and shall be used in accordance with the manufacturer's instructions.

13. TILE WORK

Glazed ceramic wall tiles

Glazed and eggshell ceramic wall tiles shall comply with B.S. 1218 and shall be of the colours described. Samples of tiles shall be submitted to the Employer's representative's Representative for approval.

Adhesive

Adhesive for fixing wall tiles shall be approved adhesive.

Fixing wall tiles

Tiles shall be wiped clean and fixed dry with the approved adhesive all in accordance with manufacturer's recommendations with straight joints 1.6mm wide, pointed in white cement.

Ceramic floor tiles

Ceramic floor tiles shall be fully vitrified clay tiles complying with B.S. 1286 and having a water absorption not exceeding 0.3%.

Laying floor tiles

For laying of floor tiles the surface of the compacted bedding shall be spread with a 3mm thick cement and sand (1:1) slurry. Floor tiles shall be wiped clean and laid dry, in a square pattern with 3mm wide joints and tapped into the grout. Pointing shall be in an approved proprietary tile grout, tinted to match floor tiles.

Finish

Cement-lime-sand undercoats shall be allowed to dry out thoroughly before a further coat is applied and scratched to provide an adequate key for the next coat. The finishing coat shall be finished with a steel float. A neat cut shall be made with the edge of the trowel through all coats of the wall plaster at junctions with concrete columns and soffits.

Internal rendering

The internal rendering on concrete block panels shall be two coat work, total 20mm finished thickness. The undercoat to be 1:1:5 cement, lime putty, sand by volume, 9mm to 12mm thick and scratched for key. The finishing coat to be 1:1:6 cement, lime putty, sand by volume, 6mm to 9mm thick, trowelled smooth. At junctions of panels to concrete columns and beam soffit, finish the rendering with a clean trowel cutting through both coats of rendering.

Preparation

Concrete floors to receive screeds shall be raked where necessary to remove concrete, plaster or mortar droppings and well brushed to remove all loose particles and dirt. Concrete floors shall be well wetted before the screeds are laid.

14. PAINTING AND DECORATING

Paint and painting

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 Employer's 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 colours 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 colour. 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) colour, quantity, batch number and date of manufacture, and expiry.

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

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.

Preparation

Copper pipes shall be washed with soap and water, roughened with abrasive paper and washed with white spirit.

Metalwork - remove all scale from unprimed iron and steelwork, degrease using proprietary solution compatible with paint finish, remove all dirt and rust by brushing with a steel wire brush. Clean all steel delivered primed, of dirt and dust and touch up any damage to primed surfaces in transit or erection.

Hardwood - rub down and brush off all dirt and dust, stop any holes or other imperfections with stopping tinted to match pigment finish.

Protective decorative finish

The protective decorative finish on hardwood joinery shall be PX65 (Pinotex) and Holdex as manufactured and supplied by Sadolins Paints (E.A.), or other equal and approved finish.

External frames and doors shall be treated with two coats PX65 (Pinotex) Pigmented before fixing and one coat PX65 (Pinotex) Top Coat after fixing.

Internal frames and doors shall be treated with two coats PX65 (Pinotex) Pigmented before fixing and one coat after fixing and finished with two coats of Holdex, Silk Matt Interior Lacquer.

Application shall be strictly in accordance with the manufacturer's recommendations.

Not more than three months should separate the initial (before fixing) and final (after fixing) coats.

Ironmongery furniture

The rates for painting shall include for taking down and refixing ironmongery furniture, kicking plates etc., as necessary.

15. ROADS AND FOOTPATHS

Preparation of road formation

After excavation or filling has been completed the road formation shall be shaped to the required contour and compacted with an 8 - 10 tonne roller.

If any soft places develop in the formation during compaction they shall be excavated to such depths as the Employer's representative may direct, refilled with hardcore or other approved granular material, levelled and re-compacted before the sub-base is laid.

Murram sub-base

The murram sub-base will be constructed only in poor soil conditions where directed by the Employer's representative. The murram shall be from an approved source quarried so as to exclude vegetable matter, loam, topsoil or clay. The California Bearing Ratio (C.B.R.) of the murram, as determined for a sample compacted to maximum density as defined under B.S. 1377 and allowed to soak in water for four days, shall not be less than 30. This C.B.R. is a guide to quality only and the compaction in the work will be judged by density.

The murram sub-base shall be of the thickness as shown on drawings or stated in the Bill of Quantities.

The sub-base shall be evenly spread and compacted using an 8-10 tonne roller for road construction and a 2-4 tonne roller for footpath construction. The Contractor will be required to maintain the selected material at its optimum moisture content to achieve maximum compaction. The roads and footpaths shall be finished to the grades and levels shown on the drawings.

Compaction and surface finish

As soon as rolling can be effected without causing undue displacement of the material, and while the material is above the minimum temperature stated in Table 6.3, it shall be uniformly compacted by an 8-10 tonne roller having a width of roll not less than 18 inches.

Rolling of surface materials

The type and weight of roller to be employed on each course of surfacing shall be approved before hand by the Employer's representative. Notwithstanding this, the Employer's representative may call for a certified weighbridge ticket in respect of any roller at any time.

Roller wheels shall always be clean and even. An adequate water tank shall be provided together with a fully operating roller sprinkler system. The roller shall be operated by a person fully trained and experienced in rolling technique.

Rolling shall be generally carried out in a longitudinal direction, working from the edge of the carriageway to the crown or, in the case of a super-elevated carriageway, from the low to the high side. The second pass should be precisely on the path of the first, before the roller shifts transversely. Heavy drive wheels should approach the freshly laid material. Reversing should be carried out slowly and smoothly and the reversing points staggered across the carriageway to avoid any wave effect. Rolling should be continued until all roll-marks are eliminated and there is no perceptible movement under the roller wheels.

Idle standing on freshly laid material is not permitted.

If the total surfacing to be compacted exceeds 3,300 sq.m. per day, the Contractor shall provide a second roller.

In confined areas where normal rolling is not possible, mechanical tamping will be permitted. The tampers must be employed systematically to give a smooth “as-rolled” finish.

No traffic will be permitted on a surfacing course until it has been compacted and in the opinion of the Employer’s representative has acquired a sufficient set.

Laying course

The laying course shall consist of 40mm sand as specified containing not more than 3% of silt and clay by weight, and, with no more than 10% retained on a 5mm sieve. It is spread to give a thickness when compacted of 40mm. The profile of the un-compacted sand should be similar to that of the final surface. The required thickness of un-compacted sand forming the laying course will depend upon its moisture content grading, and degree of pre-compaction. The laying course sand needs to be spread to a greater depth than the target compacted depth of 40mm. The amount of surcharge will be of the order of 10 to 15mm but the exact value is best determined by trial. To avoid any need to adjust the surcharge during construction, it is helpful to keep the sand grading and moisture content sensibly constant.

Once spread the sand should be screed smooth to level. For roads less than 4.5m wide, the kerbs may be used as screeding guides, but on wide pavements, it is necessary to set temporary screed rails for striking off the laying course. During spreading and screeding, operatives must not stand in the sand, otherwise uneven pre-compaction will occur causing irregularities in the final road surface. To minimize the risk of disturbance, it is advisable to avoid screeding sand long distances in front of the block laying face.

Preparation of footpath formation

After the excavation of filling has been completed as specified the footpath formation shall be regulated to an even and uniform surface, and compacted with a roller weighing not less than 2.5 tonnes.

If any soft places develop in the formation during compaction they shall be excavated and backfilled with approved granular material, levelled and re-compacted.

Chasing

Chasing in load-bearing walling for pipes, etc., is to be kept to a minimum size of cut and the positions and runs of chases are to be approved by the Employer’s representative before any cutting is commenced.

Damp-proof courses (d.p.c.)

Damp-proof courses shall be 1000 gauge polythene free from tears and holes and be laid with 150mm minimum laps on and including a levelling screed of cement mortar.

Hacking, etc.

The prices for all pavings and plastering, etc., shall include for hacking concrete surfaces and for raking out joints of walls 12mm deep and for cross scoring undercoats to form a proper key.

Plastering on walls generally shall be taken to include flush faces of lintels, beams, etc., in the walls.

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 continually damp in the interval between application of coats and for seven days after the application of the final coat.

Prices for paving

Prices for paving are to include for adequate covering and protection during the progress of the Works to ensure that the floors are handed over in perfect condition on completion.

Attendance upon employer's representative's staff

The Contractor is to provide the necessary support staff, as and when requested by the Employer's representative, to assist in some of the duties on site. These staff may include but not be limited to chainmen and other short term staff required for quality control monitoring. An allowance for these is made in the Bill of Quantities.

16. ELECTRICAL INSTALLATION

Contractor's licence

The complete electrical installation shall be carried out by a trained electrician with certificates in electrical works. The certificates have to be approved by the Project Manager before commencement of works, specifically for the Operator and Store building under Bill 7.

Regulations and standards

The complete electrical installation shall be carried out as per the Specifications and complying with the following documents: -

- a) Electric Power Act and the Rules made thereunder.
- b) The Kenya Power & Lighting Co. Ltd.'s Bye-Laws.
- c) Relevant current British, Deutsche Industries Norm (DIN), International Standards Organisation and Kenya Standard Specifications and Codes of Practice.
- d) Government Electrical Specification GES 1 and 2, which can be seen at the office of Chief Electrical Employer's representative of Ministry of Public Works.

Regulations of 14th Edition of I.E.E. Regulations are in force at present in Kenya and to be observed in conjunction with other related local Bye-Laws and Acts.

Extent of electrical work within contract

The electrical works in the proposed development are required to be complete in all respects as specified herein and shall include all items of equipment, materials, accessories, switchgear, lighting fittings, cables, labour, etc., necessary whether such items are specifically referred in the Contract or not. The Contractor shall be deemed to have included in his Tender, price for all items necessary such that the installations are complete in all respects and left in a satisfactory working order.

The Contractor will be responsible for liaison with the Kenya Power & Lighting Company Limited and the Kenya Posts & Telecommunications Corporation to suit the incoming power and telephone requirements.

All work and materials are to be of the best quality approved by the Employer's representative and strictly in accordance with the Specification.

Materials

All materials used in the Contract shall comply with the appropriate Standard Specification where such applies. .

Conduit fittings shall be the same metal as the conduit to which they are connected except that Zinc-alloy OR Aluminium-alloy fittings may be used with steel conduits.

Conduit fittings and accessories shall conform to the appropriate Standard. Conduits shall be mechanically and electrically continuous.

All bends and sets shall be made cold without altering the section of the conduit. The inner radius of the bend shall not be less than two and a half times the outside diameter of the conduit. Not more than two right angle bends will be permitted without the inter- position of the draw-in box. Where straight runs are installed draw-in boxes shall be provided at distance not exceeding 12m. Tees, elbows or sleeves of either inspection or solid type will not be permitted.

Conduits which terminate in fuse-gear, distribution boards, adaptable boxes, non-spout switches, trunking, etc., shall be connected thereto by means of screwed sockets and smooth bore brass male bushes.

Where conduits are installed flush in floor slabs or in chases in walls, they shall be held firmly in position by means of substantial pipe hooks driven into wooden plugs. Where conduits are installed on surface they shall be fixed with spacer bar saddles at a distance not exceeding one metre. Conduits shall be installed entirely separate and at least 150mm clear of the hot water and steam pipes and at least 75mm clear of cold water and other services.

The Electrical Contractor shall be responsible to ascertain from site details of reinforced concrete and structural steel work and to check from the Main Contractor's drawings the positions of walls, structural concrete and steel work finishes, etc. No reinforced concrete or steelwork shall be drilled without obtaining permission from the Structural Employer's representative.

All circular conduit boxes shall be of a malleable iron with 50mm fixing centres fitted with H.G. lids where required. They shall be long spouts internally threaded. Deep boxes or extension rings on standard circular boxes shall be used where necessary in order to bring the front face of each box flush with the ceiling or wall.

Conduit boxes installed externally shall be galvanised and where subjected to direct weather conditions they shall be compound filled.

Where the words or other approved or equal are used, they shall mean any make of equal quality but the written approval of the Employer's representative for the use of such alternative shall be obtained prior to their use in the installation. In the absence of any such request, the Employer's representative is entitled to suppose that materials used are specified.

Record drawings

The Contractor shall keep on site at all times a complete set of the drawings relative to this Contract, and as the Contract works are proceeded with, indicate in red colour on such drawings, any variations to the Contract works as executed from those shown on the Contract Drawings. The 'As Built' drawings shall be submitted to the Employer's representative on completion of works or when demanded in writing. A minimum of three sets of 'As Built' drawings shall be provided.

Testing

On completion of the electrical installation work the installation shall be subject to the test as laid down in the I.E.E. Regulations and Electric Power Act in the presence of the Employer's representative or his representative.

The Contract works shall not be considered complete until all testing has been completed to the satisfaction of the Employer's representative and the Record Drawings have been approved as installed and all specified spares have been provided.

The wiring throughout shall be in looping cables from point to point and no tee or other joints shall be permitted. Conductors of the same circuit shall be contained in the same conduit or trunking. At distribution boards, the neutral conductors shall be connected to the neutral bar in the same sequence as the line conductors connected to fuses or circuit breakers so that they can be readily identified.

Completion and inspection certificates

The electrical works will be part of the final payment certificate and therefore subject to the final joint inspection.

17. ELECTRICAL INSTALLATION - SPECIFICATION OF WORK

Scope of work

Scope of work shall include the following: -

- a) Operators Store

Complete installation of lighting power, lighting fittings, switch board, meter board, etc. at the decentralized treatment facility (DTF)

18. PARTICULAR SPECIFICATION FOR ELECTRICAL WORKS

Extent of work

The work includes the supply of all labour, material, equipment, plant and components necessary for the complete installation and setting to work of the entire electrical services for the following system as shown on the drawings.

- a) Incoming electricity supplies
- b) Electric lighting and power installation

19. MECHANICAL WORKS

General

The workmanship and materials covered by this section shall include for the supply, installation and commissioning of all mechanical equipment. It shall also include submission of shop and working drawings, testing and test connections, and operation manuals as specified.

All materials and equipment shall be obtained from reputable manufacturers, who have well established agent(s) in Kenya. The local agent(s) shall be able to provide an efficient service for the equipment and shall have ample stocks of all expendable items such as fuses, etc.

The Employer's representative reserves the right to reject manufacturer(s) or agent(s) not fulfilling the above requirements.

It is the responsibility of the Contractor to provide evidence that the equipment is in compliance with the Bills of Materials, Specifications herein, and as shown on the drawings, and that the equipment will operate satisfactorily under the conditions under which it is installed. The work shall comprise complete installation such as anchor bolts, base plates, gaskets, painting, etc., all to the satisfaction of the Employer's representative.

Drawings

The works as shown on the drawings are prepared for tendering purposes only, and it is the Contractor's responsibility to provide promptly, detailed shop drawings of the equipment he proposes to use. It is also the Contractor's responsibility to see that all openings, recesses, channels, conduits, etc., in structures are so located and installed as to fit and function properly with mechanical and electrical works.

The Contractor shall prepare all necessary detailed or workshop drawings required for manufacturing and erecting the equipment. Such drawings shall be submitted to the Employer's representative for approval prior to the commencement of manufacture and installation of the equipment. Upon completion of the works, the Contractor shall prepare and submit information on as-built drawings to the Employer's representative for his retention.

The Contractor shall be responsible for any discrepancies, errors, or omissions in the Contractor's drawings unless they are due to incorrect drawings or other written information supplied by the Employer or the Employer's representative. Approval by the Employer's representative of the Contractor's drawings shall not relieve the Contractor from any responsibility under this section.

Initial defects liability period

During the six months Defects Liability Period, the Contractor shall carry out all necessary adjustments and repairs, cleaning and lubricating, etc., required for maintaining the equipment in good working condition. A report of any work executed with respect to such maintenance shall be submitted to the Employer's representative and incorporated in Maintenance Records.

The Contractor shall bear all the costs required for maintenance and inspection services of the equipment and provide for all labour, tools, instruments and plant, and the transportation thereof, as required for the satisfactory execution of these obligations and for the provision, use and installation of all materials such as fuses, expendable items, oils, greases, etc., and such parts which are periodically renewed as relay contacts or parts which are faulty for any reason.

Manufacturer's maintenance manuals

Upon completion of the works, the Contractor shall furnish to the Employer's representative 1 copy of Manufacturer's Maintenance Manuals for the equipment installed in A-4 size loose leaf type binding containing information on the following items:

- a) Description of Equipment
- b) Full Operation and Maintenance Instructions
- c) Valve Operations
- d) Maintenance and Service Periods
- e) Lubricating Instructions
- f) Colour Code Legend
- g) Spares List
- h) Record Drawings in size A-4 / A-3
- i) Any other relevant information.

All instructions in the Manual shall be written with reference to the drawings. All valves, terminals and controls in the plant and other sites be labeled to correspond with the Operation and Maintenance Manual.

The Works will not be considered completed for the purpose of taking over until such Manual containing instructions and the drawings have been supplied to the Employer.

All costs arising to comply with this Clause is deemed to be covered in the Contractor's rates.

SECTION VII: DRAWINGS

Insert here a list of Drawings. The actual Drawings, including site plans, should be attached to this section or annexed in a separate folder.

SECTION VIII: BILL OF QUANTITIES

Provide here sufficient information, BOQ, on the quantities of Works to be performed.

SECTION IX: TENDER FORMS

A. Form of Tender

[date

] To:

We offer to execute the [name and identification number of contract] in accordance with the Conditions of Contract accompanying this Tender for the Contract Price of [amount in numbers], [amount in words] [name of currency].

The Contract shall be paid in the following currencies:

Currency	Percentage payable in currency	Rate of exchange: one foreign equals [insert local]	Inputs for which foreign currency is required
(a)			
(b)			

The advance payment required is:-

Amount	Currency
(a)	
(b)	

We accept the appointment of [name proposed in Tender Data Sheet] as the adjudicator.

or

We do not accept the appointment of [name proposed in Tender Data Sheet] as the Ad- judicator, and propose instead that [name] be appointed as Adjudicator, whose daily fees and biographical data are attached.

We are not participating, as Tenders, in more than one Tender in this Tendering process other than alternative Tenders in accordance with the Tendering documents.

Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the contract has not been declared ineligible by the Kenya Government under Kenya's laws or any other official regulations.

This Tender and your written acceptance of it shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest or any Tender you receive.

We hereby confirm that this Tender complies with the Tender validity and Tender Security required by the Tendering documents and specified in the Tender Data Sheet.

Authorized Signature: _____

Name and Title of Signatory: _____

—

Name of Tenderer: _____

—

Address:

Appendix to Tender

Schedule of Adjustment Data

[In Tables A, B, and C, below, the Tenderer shall (a) indicate its amount of local currency payment, (b) indicate its proposed source and base values of indices for the different foreign currency elements of cost, (c) derive its proposed weightings for local and foreign currency payment, and (d) list the exchange rates used in the currency conversion. In the case of very large and/or complex works contracts, it may be necessary to specify several families of price adjustment formulae corresponding to the different works involved.]

Table A. Local Currency

Index code	Index description	Source of index	Base value and date	Tenderer's related currency amount	Range of weighting proposed by the Procuring Entity	Tenderer's proposed weighting
	Non-adjustable	—	—	—	a: ----- to ----- *	a: *
					b: ----- to ----- *	b:
					c: ----- to ----- *	c:
					d: ----- to ----- *	d:
					e: ----- to ----- *	e:
					etc.	etc.
Total						1.00

Table B. Foreign Currency

State type: [If the Tenderer wishes to quote in more than one foreign currency, this table should be repeated for each foreign currency.]

Index code	Index description	Source of index	Base value and date	Tenderer's related source currency in type/ amount	Equivalent in Foreign Currency 1	Range of weighting Proposed by the Procuring Entity	Tenderer's proposed weighting
	Nonadjustable	—	—	—		a: _____* b: ----- to -----* c: ----- to -----* d: ----- to -----* e: ----- to -----* etc.	a: _____* b: _____ c: _____ d: _____ e: _____ etc.
Total							1.00

Table C. Summary of Payment Currencies

For [insert name of Section of the Works]

[Separate tables may be required if the various sections of the Works (or of the Bill of Quantities) will have substantially different foreign and local currency requirements. The Procuring Entity should insert the names of each Section of the Works.]

Name of payment currency	A Amount of currency	B Rate of exchange (local currency per unit of foreign)	C Local currency equivalent $C = A \times B$	D Percentage of Net Tender Price (NBP) $100 \times C / \text{NBP}$
Local currency		1.00		
Foreign currency #1				
Foreign currency #2				
Foreign currency #				
Net Tender Price				100.00
Provisional sums expressed in local currency	*	*	*	
TENDER PRICE				

Authorized Signature: _____

Name and Title of Signatory: _____

Name of Tenderer: _____

Address:

B. Tender-Securing Declaration (Mandatory)

Date: [insert **date** (as day, month and year)]

Tender No.: [insert number of Tendering
process]

Alternative No.: [insert identification No if this is a Tender for an alternative]

To: [insert complete name of Procuring
Entity] We, the undersigned, declare that:

We understand that, according to your conditions, Tenders must be supported by a Tender-Securing Declaration.

We accept that we will automatically be suspended from being eligible for Tendering in any contract with the Procuring Entity for the period of time of *[insert **number of months or years**]* starting on *[insert **date**]*, if we are in breach of our obligation(s) under the Tender conditions, because we;

- a) Have withdrawn our Tender during the period of Tender validity specified in the Form of Tender; or
- b) Having been notified of the acceptance of our Tender by the Procuring Entity during the period of Tender validity,
 - (i). Fail or refuse to execute the Contract, if required, or
 - (ii). Fail or refuse to furnish the Performance Security, in accordance with the ITT.

We understand this Tender Securing Declaration shall expire if we are not the successful Tenderer, upon the earlier of;

- 1) Our receipt of your notification to us of the name of the successful Tenderer; or
- 2) Thirty days after the expiration of our Tender.

Signed: [insert signature of person whose name and capacity are shown] In the capacity of [insert legal capacity of person signing the Tender Securing Declaration]

Name: [insert complete name of person signing the Tender Securing Declaration]

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

Dated on _____ day of _____, _____ *[insert **date of signing**]*

Corporate Seal (where appropriate)

C. Confidential Business Questionnaire

- 1 Individual Tenderer or Individual Members of joint Ventures
- Constitution or legal status of Tenderer: *[attach copy]*
- Place of registration: *[insert]*
- Principal place of business:
[insert]
- Power of attorney of signatory of Tender: *[attach]*
- Registration certificate *[attach]* current Business License *[attach]*

Total annual volume of construction work performed in two years, in Kenyan shillings as specified in the Tender Data Sheet; *[insert]*

Work performed as prime Contractor on works of a similar nature and volume over the last two years or as specified in the Tender Data Sheet in Kenyan Shillings. Also list details of work under way or committed, including expected completion dates.

Project name and country	Name of client and contact person	Contractors Participation	Type of work performed and year of completion	Value of contract
(a)				
(b)				

Major items of Contractor's Equipment proposed for carrying out the works. List all information requested below. Refer also to sub-Clause 12.3 of the Instructions to Tenderers.

Item of equipment	Description, make, and age (years)	Condition (new, good, Poor) and number available	Owned, leased (from whom?) or to be purchased (from whom?)
(a)			
(b)			
(c)			
(d)			

Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data. Refer also to sub-Clause 12.3 of the Instructions to Tenderers and Sub-Clause 10.1 of the General Conditions of Contract.

Position	Name	Years of Experience (general)	Years of experience in proposed position
(a)			
(b)			

Proposed sub-contractor and firms involved. Refer to Clause 7 of General Conditions of Contract.

Sections of the Works	Value of subcontract	Subcontractor (name and address)	Experience in similar work
(a)			
(b)			

Financial reports for the number of years specified in the Tender Data Sheet.

Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List below and attach copies of support documents.

Name, address, and telephone, e-mail address, and facsimile numbers of banks that may provide references if contracted by the Procuring Entity.

Information on current litigation in which the Tenderer is involved.

Other party(ies)	Cause of dispute	Amount involved
(a)		
(b)		

Statement of compliance with the requirements of sub-Clause 3.2 of the Instructions to Tenderers.

Proposed Program (work method and schedule). Descriptions, drawings, and charts, as necessary, to comply with the requirements of the Tendering documents.

2. Joint Ventures

The information listed in 1.1 - 1.11 above shall be provided for each partner of the joint venture.

The information in 1.12 above shall be provided for the joint venture.

Attach the power of attorney of the signatory (ies) of the Tender authorizing signature of the Tender on behalf of the joint venture.

Attach the Agreement among all partners of the joint venture (and which is legally binding on all partners), which shows that:

- (a) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
- (b) one of the partners will be nominated as being in charge, authorized to incur liabilities, and receive instructions for and on behalf of any and all partners of the joint venture; and
- (c) the execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.

3. Additional Requirements

3.1

Tenderers should provide any additional information required in the **Tender Data Sheet** or to fulfil the requirements of sub-Clauses 12.1 of the Instructions to Tenderers, if applicable.

D. Integrity Declaration

UNDERTAKING BY TENDERER ON ANTI - BRIBERY POLICY / CODE OF CONDUCT AND COMPLIANCE PROGRAMME

1. Each Tenderer must submit a statement, as part of the Tender documents, in either of the two given formats which must be signed personally by the Chief Executive Officer or other appropriate senior corporate officer of the Tendering company and, where relevant, of its subsidiary in the Kenya. If a Tender is submitted by a subsidiary, a statement to this effect will also be required of the parent company, signed by its Chief Executive Officer or other appropriate senior corporate officer.
2. Tenderers will also be required to submit similar No-bribery commitments from their subcontractors and consortium partners; the Tenderer may cover the subcontractors and consortium partners in its own statement, provided the Tenderer assumes full responsibility.
3.
 - a) Payment to agents and other third parties shall be limited to appropriate compensation for legitimate services.
 - b) Each Tenderer will make full disclosure in the Tender documentation of the beneficiaries and amounts of all payments made, or intended to be made, to agents or other third parties (including political parties or electoral candidates) relating to the Tender and, if successful, the implementation of the contract.
 - c) The successful Tenderer will also make full disclosure [quarterly or semi-annually] of all payments to agents and other third parties during the execution of the contract.
 - d) Within six months of the completion of the performance of the contract, the successful Tenderer will formally certify that no bribes or other illicit commissions have been paid. The final accounting shall include brief details of the goods and services provided that they are sufficient to establish the legitimacy of the payments made.
 - e) Statements required according to subparagraphs (b) and (d) of this paragraph will have to be certified by the company's Chief Executive Officer, or other appropriate senior corporate officer.
4. Tenders which do not conform to these requirements shall not be considered.
5. If the successful Tenderer fails to comply with its No-bribery commitment, significant sanctions will apply. The sanctions may include all or any of the following:
 - a) Cancellation of the contract;
 - b) Liability for damages to the public authority and/or the unsuccessful competitors in the Tendering possibly in the form of a lump sum representing a pre-set percentage of the contract value (liquidated).
6. Tenderers shall make available, as part of their Tender, copies of their anti-Bribery Policy/Code of Conduct, if any, and of their general or project - specific - Compliance Program.
7. The Government of Kenya has made special arrangements for adequate oversight of the procurement process and the execution of the contract, and has invited civil society and other competent Government Departments to participate in the

oversight. Those charged with the oversight responsibility will have full access to all documentation submitted by Tenderers for this contract, and to which in turn all Tenderers and other parties involved or affected by the project shall have full access (provided, however, that no proprietary information concerning a Tenderer may be disclosed to another Tenderer or to the public).

ANTI-CORRUPTION DECLARATION COMMITMENT/ PLEDGE

(Sections 39, 40, 41, 42, 43 & of the PPD Act, 2005)

I/We/Messrs.....

of Street, Building, P O Box.....

.....

Contact/Phone/E mail.....

declare that Public Procurement is based on a free and fair competitive Tendering process which should not be open to abuse.

I/We

declare that I/We will not offer or facilitate, directly or indirectly, any inducement or reward to any public officer, their relations or business associates, in connection with

Tender/Tender No

for or in the subsequent performance of the contract if I/We am/are successful.

Authorized

Signature.....

Name and Title of Signatory.....

E. Letter of Acceptance

[Letter head paper of the Procuring Entity]

[date]

To: [name and address of the Contractor]

This is to notify you that your Tender dated [date] for execution of the [name of the Contract and identification number, as given in the Contract Data Sheet] for the Contract Price of the equivalent of [amount in numbers and words] [name of currency], as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by us.

We confirm that [insert name proposed by the procuring entity] to be the Adjudicator. We accept that [*name proposed by Tenderer*] be appointed as Adjudicator.

Or

We do not accept that [*name proposed by Tenderer*] be appointed as adjudicator, and by sending a copy of this letter of acceptance to [*insert the name of the Appointing Authority*], we are hereby requesting [*name*], the Appointing Authority, to appoint the adjudicator in accordance with Clause 44.1 of the Instructions to Tenderers.

You are hereby instructed to proceed with the execution of the said works in accordance with the Contract documents.

Please return the contract dully signed.

Authorized Signature: _____

Name and Title of Signatory: _____

Name of Agency: _____

Attachment: Form of Contract

F. Form of Contract Agreement

This Agreement, made the [day] day of [month], [year] between [name and address of Procuring Entity] (hereinafter called “the Procuring Entity”) and [name and address of Contractor] (hereinafter called “the Contractor”) of the other part.

Whereas the Procuring Entity is desirous that the Contractor execute [name and identification number of contract] (hereinafter called “the Works”) with the objectives of [insert functional objectives of the works] and the Procuring Entity has accepted the Tender by the Contractor for the execution and completion of such works and the remedying of any defects therein in the sum of [contract price in words and figures] (hereinafter called “Contract Price”).

NOW THIS AGREEMENT WITNESSES AS FOLLOWS:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement;
2. In consideration of the payments to be made by the Procuring Entity to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Procuring Entity to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract;
3. The Procuring Entity hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

In Witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____

Was hereunto affixed in the presence of: _____

Signed, Sealed, and Delivered by the said _____

In the presence of: _____

—

Tendering Signature of Procuring Entity _____

—

Binding Signature of Contractor _____

SECTION X: FORMS OF SECURITY

A. Tender Security (Bank or Insurance Guarantee)

(Optional)

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

[insert bank's or insurance company's name, and address of issuing branch or office]

Beneficiary: [insert name and address of Procuring Entity]

Date: [insert date]

TENDER GUARANTEE No.: [insert number]

We have been informed that [insert name of the Tenderer; if a joint venture, list complete legal names of partners] (hereinafter called "the Tenderer") has submitted to you its Tender dated [insert date] (hereinafter called "the Tender") for the execution of [insert name of Contract] under Invitation for Tenders No. [insert IFT number] ("the IFT").

Furthermore, we understand that, according to your conditions, Tenders must be supported by a Tender Guarantee.

At the request of the Tenderer, we [insert name of bank or insurance company] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [insert amount in figures expressed in the currency of the Purchaser's Country or the equivalent amount in an international freely convertible currency] ([insert amount in words]) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Tenderer is in breach of its obligation(s) under the Tender conditions, because the Tenderer;

- a) Has withdrawn its Tender during the period of Tender validity specified by the Tenderer in the Form of Tender; or
- b) Does not accept the correction of errors in accordance with the Instructions to Tenderers (hereinafter "the ITT") of the IFT; or
- c) Having been notified of the acceptance of its Tender by the Procuring Entity during the period of Tender validity;
 - (i). Fails or refuses to execute the Contract Form, if required, or
 - (ii). Fails or refuses to furnish the Performance Security, in accordance with the ITT.

This Guarantee shall expire;

- a) If the Tenderer is the successful Tenderer, upon our receipt of copies of the Contract signed by the Tenderer and of the Performance Security issued to you by the Tenderer; or
- b) If the Tenderer is not the successful Tenderer, upon the earlier of;
 - (i) Our receipt of a copy of your notification to the Tenderer that the Tenderer was unsuccessful, or
 - (ii) Thirty days after the expiration of the Tenderer's Tender.

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

[signature(s) of authorized representative(s)]

B. Performance Bank or Insurance Guarantee [Unconditional]

[The Bank or Insurance Company/successful Tenderer providing the Guarantee shall fill in this form in accordance with the instructions indicated in brackets, if the Procuring Entity requires this type of security.]

[insert bank's or insurance company's name, and address of issuing branch or office]

Beneficiary: [insert name and address of Procuring Entity]

Date: [insert date]

PERFORMANCE GUARANTEE No.: [insert Performance Guarantee number]

We have been informed that *[insert name of Contractor]* (hereinafter called "the Contractor") has entered into Contract No. *[insert reference number of the Contract]* dated with you, for the execution of *[insert name of Contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a Performance Guarantee is required.

At the request of the Contractor, we *[insert name of Bank or Insurance Company]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[insert amount in figures]* (*[insert amount in words]*), such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall expire not later than thirty days from the date of issuance of the Taking-Over Certificate.

[signature(s) of an authorized representative(s) of the Bank or Insurance Company]

C. Bank or Insurance Guarantee for Advance Payment

[Bank's or Insurance Company's Name and Address of Issuing Branch or Office]

Beneficiary: _____[Name and Address of Procuring Entity] **Date:**

ADVANCE PAYMENT GUARANTEE No.: _____

We have been informed that *[name of Contractor]* (hereinafter called "the Contractor") has entered into Contract No. *[reference number of the contract]* dated _____ with you, for the execution of *[name of contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum *[amount in figures]* () *[amount in words]* is to be made against an advance payment guarantee.

At the request of the Contractor, we *[name of Bank or Insurance Company]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[amount in figures]* () *[amount in words]* upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between _____*[name of Procuring Entity]* and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

No drawing may be made by you under this guarantee until we have received notice in writing from you that an advance payment of the amount listed above has been paid to the Contractor pursuant to the Contract.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that eighty (80) percent of the Contract Price has been certified for payment, or on the _____ day of _____, 2____, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

Yours truly,
Signature and seal: _____

Name of Bank or Insurance Company: _____
Address: _____
Date: _____

SECTION XI: ADDITIONAL FORMS

Name of Contractor:

in association with the Water Sector Trust Fund



GENERAL CONTRACTOR APPLICATION FORM

Contract Title:

.....

Contract Number:

.....

Contract Start Date:

.....

**Employers
Name and Address:**

.....

.....

**Contractor's
Name and Address:**

.....

.....

**Project Implementation
Unit of WSTF
Name and Address:**

.....

.....

What are you applying for?

Description

Tick

Description

Tick

Joint Work Measurement

Final Joint Inspection

Interim Payment Certificate No. _____

Completion Certificate

Final Payment Certificate No. _____

Others

Variation

Specify:

Applied

by: Sign:

Date:

Murang'a South Water and Sanitation Co. Ltd

in association with the Water Services Trust Fund



JOINT WORK MEASUREMENT SHEET

Contract Title: Contract Number: Contract Start Date:		Employers Name and Address:	
Contractor's Name and Address:		Project Implementa- tion Unit of WSTF Name and Address:	


Modules: RBBT/ ST/ABR/ VFCW/ SDRB/ CA/ OS:


For Interim/Final Payment Certificate No.: _____; date: _____


Bill Item No.	Description	Unit	Quantity used


Comments (if required attach documentation):

Prepared and checked by Supervisor (WSP)	WSP Approval by (TSM)):	WSTF Approval by CRM	Accepted by Contractor
Name: Sign:	Sign: Date:	Sign: Date:	Sign: Date:

Name of WSP.....			
in association with the Water Services Trust Fund			
INTERIM PAYMENT CERTIFICATE			No.
Contract Title:	.....	
Contract Number:	.....	
Contract Start Date:	.....	
Employers Name and Address:	..... .....	
Contractor's Name and Address:	..... .....	
Project Implementation Unit of WSTF Name and Address:	..... .....	
Percentage of Payment for this certificate:			
			%
AMOUNT in KSH			
Total Value of Contract:			
Paid to Date:			
Remaining Contract Balance:			
Percentage of Payment for this certificate:			
Work Executed for this certificate (describe works):			
Other Claims (must have supporting documents):			
Sub-total			
Deduct 10% Retention fee			
Withholding Tax 3%			
Deduct 6% VAT			
NET AMOUNT DUE			
<i>I Certify that the sum of KSH (Kenya Shillings) only is due to and payable on demand and according to terms of Contract</i>			
Prepared and checked by TSM (WSP):	WSP Approval: (Managing Director)	WSTF Approval (WSTF Engineer):	
Sign:	Sign:	Sign:	
Date:	Date:	Date:	

Name of WSP.....		
in association with the Water Services Trust Fund		
FINAL PAYMENT CERTIFICATE		
Contract Title:	.....
Contract Number:	.....
Contract Start Date:	.....
Employers Name and Address:	..... .....
Contractor's Name and Address:	..... .....
Project Implementation Unit of WSTF Name and Address:	..... .....
Percentage of Payment for this certificate:		AMOUNT in KSH
Total Value of Contract:		
Paid to Date:		
Remaining Contract Balance:		
Percentage of Payment for this certificate:		
Work Executed for this certificate (describe works):		
Other Claims (must have supporting documents):		
Sub-total		
Deduct 10% Retention fee		
Withholding Tax 3%		
Deduct 6% VAT		
AMOUNT DUE		
<i>I Certify that the sum of KSH (Kenya Shillings)</i> <i>only is due to</i> <i>and payable on demand</i> <i>and according to terms of Contract</i>		
Prepared and checked by TSM	WSP Approval by Managing Director	WSTF Approval By WSTF Engineer
Sign:	Sign:	Sign:
Date:	Date:	Date:

Name of WSP..... in association with the Water Services Trust Fund		
CERTIFICATE OF COMPLETION OF WORKS		
Contract Title:	.....
Contract Number:	..... ....
Contract Start Date:	..... .....
Contract Price:	KSh	
Contractor's Name and Address:	..... P.O.Box..... .....,00..... Kenya	
Employers Name and Address:	.....(WSP name) P.O.Box..... .....,00..... Kenya	
Project Implementation Unit Name and Address:	.....WSP on behalf of the .....Water Services Board P.O. Box Nairobi, 00100 Kenya	
In accordance with Clause 58.1 of the Conditions of Contract, the Works were inspected and are Certified as being Complete on The Defects Liability Period ends on Notes: 1. Final Payment Certificate to be processed immediately. 2. The Employer takes over the Site as from 3. The contractor is supposed to hand over the as built drawings within the Defects Liability Period		
Date of Issue:	..... Name of Project Manager Authorised Representative of WSP (Project Manager for the Contract)	..... Chief Executive Officer of the Water Services Board/ Coun- ty

Name of WSP..... in association with the Water Services Trust Fund		
TAKING OVER CERTIFICATE		
Contract Title:	.....
Contract Number:	..... ....
Contract Start Date:	..... .....
Contract Price:	KSh	
Contractor's Name and Address:	..... P.O.Box..... .....,00..... Kenya	
Employers Name and Address:	..... (WSP name) P.O.Box..... .....,00..... Kenya	
Project Implementation Unit Name and Address:	..... WSP on behalf of the Water Services Board P.O. Box Nairobi, 00100 Kenya	
In accordance with Clause 38 (Correction of Defects) and Clause 52.2 of the Conditions of Contract, the Defects Liability Period has ended on <u>Notes:</u> 1. The performance security in form of the bank guarantee has to be released to the contractor Immediately 2. The retention fee has to be released to the contractor immediately 3. all Defects notified by the Project Manager to the Contractor have been corrected 4. No Taking Over Certificate shall be given to the contractor before handover of the relevant as built drawings to the Employer		
Date of Issue:, Kenya	..... Name of Project Manager Authorised Representative of WSP (Project Manager for the Contract)	..... Chief Executive Officer of the Water Services Board

in association with the Water Services Trust Fund



No

Contract Title:
Contract Number:
Contract Start Date:

**Employers
Name and Address:**

**Contractor's
Name and Address:**

Project Implementation Unit of WSTF
Name and Address:

Basis for the confirmation of the variation

Variation Application form fully filled: ☐

Supporting documents attached: ☐ (e.g. copy of instruction at the site from instruction book)

Quotation for additional material attached :

Contractor informed Employer in time of the variation: ☐ (see also Clause 35 "Early warning")

Breakdown of Works confirmed as a variation to the contract

Description	Unit	Quantity	Rate in Kes	Subtotal in Kes
Subtotal				
VAT (16%)				
Total				

Prepared and checked
by TSM

**WSP Approval
by Managing Director**

**WSTF Approval by
WSTF Engineer**

Sign:

Sign:

Sign:

Date:

Date:

Date:

Notes:

1. The variation order Form has to be prepared by the Technical Services Manager, approved by the Managing Director and respective WSTF Engineer
2. No approval shall be given without a fully filled variation application form and supporting documents. If the variation is based on an instruction given at the site by the responsible supervisor from the WSP, the contractor is supposed to attach a copy of this instruction to the application form.

SECTION XII: WORKPLAN

Insert Workplan

SECTION XIII: EVALUATION CRITERIA

1. Members of Tender Committee:

Indicate the information below:

No.	Name	Position	Mobile No.:	e-mail adress

2. Mandatory Requirements (MR)

Evaluation and comparison of Tenders:

The following evaluation criteria shall be applied not withstanding any other requirement in the tender documents.

LEGEND: Indicate with Y/N (Yes/No) if MR was submitted to full satisfaction of tender committee.

Indicate with P/N (Pass or Fail) in last row if the tender's submission is responsive or not.

MR-No.	ITEM DESCRIPTION	SPECIFIC RE- QUIREMENTS	TENDERER NUMBER				
1	Must Submit a Valid copy of certifi- cate of Registration/Incorporation	Copy with year of Registration/ In- corporation					
2	Must Submit a Valid copy of Valid Tax Compliance certificate	Serial No. Expiry Date					
3	Must Fill the Price Schedule in the Format provided	Dully Filled & Signed					
4	Must Fill the Form of Tender in the Format provided	Dully Filled & Signed					
5	Must submit a Tender Security of 2% of the tender sum	Form (Bankers cheque, Unconditional bank guarantee) Amount (2% of tender sum) Validity(120 days)					
6	Must submit a Valid copy of certifi- cate of registration with the National Construction Authori- ty (NCA - 7 Water works & above)	Indicate Registra- tion Class					
7	Must submit a duly filled up Confidential Business Questionnaire in format provided	Duly Filled and Signed					
8	Valid Audited Accounts for the last 3 years (15/16,16/17, 17/18)	Signed and stamped by Auditor					
9	Must submit a Certificate of Pre-tender site visit duly signed	Duly signed Certificate					

10	Litigation history related to government contracts - Fill the litigation form and should be signed by the commissioner of oaths	Form signed by commissioner of oaths					
11	The tender does not have in-						
	terlineations, erasures or overwriting except as necessary to correct errors made by the tenderer, in which case such corrections have been initialled by the person or persons signing the tender						
TENDERER'S SUBMISSION STATUS (indicate P/F)							

3. Technical Evaluation Scores

The Technical Evaluation will be marked out of 100 and will determine the technical score (TS)

TS No.	EVALUATION ATTRIBUTE	WEIGHING SCORES	MAX SCORE	TENDERER NUMBER				
				B1	B2	B3	B4	B5
1	Number of years in construction of similar sanitation projects	❖ 10 years and above - 10 marks ❖ Others pro-rated at: Number of years x20 / 10	20 marks					
2	Provide a list of clients and references to which the company has done similar works (Attach certified copies of reference letters)	❖ 10 clients with reference letters from the clients - 10 Marks ❖ Others pro-rated at: Number of clients x10/ 10	10 marks					
3	Financial Strength of the company. Current Ratio = Current Assets/ Current liabilities	❖ 2:1 ratio - 10 marks ❖ Others pro-rated at: The ratio x10 / 2	10 marks					
4	Financial Strength of the company: Acid Test Ratio = Current Assets - Average stock/ Current Liabilities	❖ 1:1 ratio - 10 marks ❖ Others pro-rated at: The ratio x10 / 1	10 marks					
5	Equipments and accessories owned by the company and to be directly assigned to the project during the contract period (Attach certified	Provide details/ list of at least 10 equipments and accessories and explain what they will be used for in the project implementation	20 marks					

	copies of certificates of ownerships, purchase receipts, sale agreements or lease agreements)	(2 marks for each equipment)						
.6	Physical Facilities:	Details of physical	10					
	provide details of physical address and contacts (Attach evidence)	address and contacts with copy of either title, lease documents or latest utility bill	marks					
7	Staffing Capacity (Attach certified copies of certificates, membership to professional bodies)	❖ Site Engineer - Civil/Water with a degree - 5 marks ❖ Foreman with a diploma - 3 marks ❖ Supervisors - 2 marks	10 marks					
8	Delivery schedule of works for the period indicated	Provide details	5 marks					
9	Organizational Structure	Give structure with details of responsibilities	5 marks					
	TOTALS		100 Marks					

a. Financial Evaluation Scores

The evaluation will check the arithmetic errors and confirm the changed prices with the tenderer. Award is to be done to the lowest evaluated Tenderer.

MR-No.	EVALUATION ATTRIBUTE	WEIGHTING SCORE	MAX SCORE	TENDERER NUMBER				
				1	2	3	4	5
1	Total Tender quotation Sum	Indicate sum in Kes						
2	Variation with engineer's estimate	Indicate variation in % (max. 15% of Eng. Estimate)						

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URBAN SANITATION UPSCALING PROGRAM



BILL 1 - PRELIMINARY AND GENERAL

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
1.00	<u>SPECIAL REQUIREMENT</u>				
1.10	Allow a P.C. Sum of KShs. 300,000 for provision of supervision costs by an approved Resident Inspector of Works qualified with Diploma in Civil Engineering/Building and Construction or approved equivalent from a reputable institution of learning and with a minimum of 2 years of experience in related field.	item	1s	300,000.00	
1.20	Add% for profit, administration, attendance upon, overheads, etc. for Item 1.10 above (% to be as per Appendix to Form of Tender)	%	0.0		-
1.30	Allow for supply of materials and construction of a temporary Site Office (to be used by the Contractor) and Store (to be used by the Supervising Staff), total area not exceeding 30m ² . The structure to revert back to the Contractor upon completion of the Project.	item	1s		
2.00	<u>RELOCATION OF SERVICES</u>				
2.01	Add% for profit, administration, attendance upon, overheads, etc. for Item 2.10 above (% to be as per Appendix to Form of Tender)	%	0.0		-
SUBTOTAL 1					-
TOTAL					-

NOTE:

1. All the rates include 16% VAT

2. All the rates include supply, handling, assembling, installation, deployment of machines, processing (i.e. welding), and all related labour work

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BILL 2 - RECEIVING BAY / BALANCING TANK / SLUDGE DRYING BED

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
1.00	<u>EARTHWORKS</u>				
	The rates shall include for all strutting, shuttering, stabilizing excavation phases and keeping the excavation free of water by pumping, bailing or other means				
1.10	<u>Top soil removal</u>				
1.11	Bulk excavations and top soil removal for the whole area of Receiving Bay and Balancing Tank (depth n.e. 150mm). Spread top soil stacked on site for reuse. Level and prepare for grassing and landscaping.	m ²	133.8		-
1.20	<u>Excavation for foundation</u>				
	Excavate for foundations, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by the Project Manager				
1.21	Maximum depth n.e. 1m after stripping of top soil	m ³	107.0		-
1.22	Disposal of excavated material which cannot be used as backfill material on site. The rates shall include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority	m ³	66		-
1.23	Extra over for Items 1.21-1.22 : for excavation in rock Class 'A', blasting not permitted (Provisional), to be approved and directed by the Project Manager	m ³	64.2		-
1.24	-Ditto- for excavation in rock Class 'B', blasting not permitted (Provisional)	m ³	32.1		-
1.25	-Ditto- for excavation in rock Class 'C', blasting not permitted (Provisional)	m ³	10.7		-
1.30	<u>Compaction</u>				
1.31	Provide approved hard core and compact in one layer of 300mm and blinded with sand or gravel	m ³	24.4		-
1.32	Provide approved granular fill and compact in one layer as per details in drg and blinded with sand or gravel	m ³	3.9		-
SUBTOTAL 1					-
2.00	<u>SUBSTRUCTURE: CONCRETE / REINFORCEMENT/ FORMWORKS</u>				
2.10	<u>Damp-proof membrane</u>				
2.11	Damp-proof membrane, gauge 1000 laid over hard core	m ²	81.3		-
2.20	<u>Concrete</u>				
2.21	Blinding: Provide all materials, mix and place concrete grade C15/20 (1:3:6) for blinding of ground slab, mixing to be done using concrete mixer approved to be suitable for the type of works by the Project Manager	m ²	83.5		-
2.22	Ground slab: Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for ground slab, mixing to be done using concrete mixer approved to be suitable for the type of works by the Project Manager	m ³	16.4		-
2.23	Columns: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)	m ³	0.8		-
2.30	<u>Reinforcement</u>				
			83.5		
2.31	Provide all materials as specified below and fix at sites; fabric reinforcement no. A142 mesh size 150 x 150mm weighing 2.22 kg per m2 , including Bends, tying Wire and spacer blocks; fabric reinforcement with minimum 150mm wide side and end laps, laid in bed	m ²	84		-
2.32	Provide reinforcement - deformed high yield steel Y10 bars	Kg	193		-
2.40	<u>Formwork</u>				
	Provide and fix shuttering including propping, strutting and striking, all as specified				
2.41	Wrot Formwork - Class F3 Finish				
2.411	Sides of columns	m ²	16.6		-
2.50	<u>Finishing</u>				
2.51	Screed the ground slab with water proof cement mortar 1:3 with a slope of 1% towards the outlet for the Balancing tank	m ²	63.2		-
SUBTOTAL 2					-

BILL 2 - RECEIVING BAY / BALANCING TANK / SLUDGE DRYING BED

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
3.00	<u>WALLING</u>				
3.10	<u>Natural stone wall</u>				
	Natural Stone Block Walling, medium chisel dressed, reinforced with 20 swg hoop iron at every third course, and bedded, jointed and bonded in cement mortar (1:3)				
3.11	200 mm walling	m ²	72.9		-
3.20	<u>Plaster</u>				
3.21	Plaster internally and externally with water proof cement mortar 1:3	m ²	145.73		-
SUBTOTAL 3					-
4.00	<u>SUPERSTRUCTURE: CONCRETE / REINFORCEMENT/ FORMWORKS</u>				
4.10	<u>Concrete</u>				
4.11	Suspended slab Balancing Tank: Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for balancing tank suspended slab, depth of 150mm. Allow for 3 openings of 600x400mm for the manholes	m ³	9.2		-
4.12	Suspended slab Receiving Bay: Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for the two receiving bay suspended slabs, depth of 150mm.	m ³	0.2		-
4.13	Beams: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)	m ³	2.4		-
4.14	Suspended slab outlet chamber: Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for outlet chamber suspended slab, depth of 150mm. Allow for a circular opening of 600mm dia.	m3	0.2		-
4.15	Provide and install reinforced fibre covers of 600x450mm including frame and fitted with a handle for the balancing tank and the outlet chamber	nr	6		-
4.20	<u>Reinforcement</u>				
4.21	Provide reinforcement - deformed high yield steel Y10 bars	Kg	1107.0		-
4.30	<u>Formwork</u>				
	Provide and fix shuttering including propping, strutting and striking, all as specified				
4.31	Sawn Formwork - Class F1 Finish				
4.311	Horizontal soffits of suspended slabs	m ²	57.8		-
4.32	Wrot Formwork - Class F3 Finish				
4.321	Sides of beams	m ²	23.7		-
SUBTOTAL 4					-
5.00	<u>PIPEWORK - PIPES and FITTINGS</u>				
5.10	<u>Pipes</u>				
	Supply, transport to site and store in secure place, including jointing material, bolts, gaskets, packing, jointing glues, etc. as applicable. Install, test and commission.				
5.11	100 mm dia. uPVC pipe 500mm long with a bend bringing the overflow bypass from the balancing tank to the outlet chamber. All fittings should be protected with a coat of water paint and two coats of emulsion paint	item	ls		-
5.12	100 mm dia. uPVC pipe (connected to the gate valve at the balancing tank outlet)	m	0.4		-
5.13	100 mm dia. uPVC pipe (connecting the balancing tank outlet chamber to the sludge drying bed inspection chamber)	m	10		-
5.14	100mm dia. class 41 uPVC pipe (underdrain pipes of the sludge drying bed)	m	11		-
5.15	100mm dia. class 41 uPVC pipe (from the sludge drying bed inspection chamber to the next module)	m	5		-
5.16	Provide all materials and perforate the pipes supplied under item 5.14 (underdrain pipes). Perforation shall be holes of 10mm diameter at 100mm center to center spacing. The holes are placed on two parallele lines located at a 30° angle from the central line as per drawings	m	10		-
5.20	<u>Fittings and Valves</u>				
5.21	100mm dia. Gate valve including stub, flange, bolts and nuts (controlling the flow from the outlet chamber)	nr	1		-
5.30	<u>Pipe laying</u>				

BILL 2 - RECEIVING BAY / BALANCING TANK / SLUDGE DRYING BED					
ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
	The rate quoted shall be deemed to include, supply, transport to site, storage, excavation, laying, jointing and backfilling with selected excavated material in pipe trenches. The rates shall include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority				
	uPVC Flexible Jointed Pipes Nominal Diameter 100mm				
5.31	Outlet pipe connecting the balancing tank outlet to the sludge drying bed inspection chamber to the next module (anaerobic reactor) at a depth n.e. 1.5m	m	5		-
SUBTOTAL 5					-
6.00	METAL WORKS				
6.10	GMS Coarse Screen, size 500x640mm, fabricated using GMS bars, 5x50 mm at spacing 30 mm (centre to centre) welded to frame hinged into concrete walls, all as per details on Drg. Apply 1 coat of primer and 2 coats of approved gloss paint	nr	1		-
6.20	GMS Fine Screen, size 500x640mm, fabricated using GMS bars, 5x50 mm at spacing 15 mm (centre to centre) welded to frame hinged into concrete walls, all as per details on Drg. Apply 1 coat of primer and 2 coats of approved gloss paint	nr	1		-
6.30	Provide and install a rectangular MS sluice gate size 400x400mm with an extended handle on a 25mm MS sliding channel. Apply 1 coat of primer and 2 coats of approved gloss paint	nr	2		-
SUBTOTAL 6					-
7.00	FILTER MEDIA				
7.10	PE liner				
7.11	Supply and place the 1mm thick PE liner as shown on the drawing. Allow for welding of joints between two sheets using hot wedge welding machine (where applicable)	m ²	66.5		-
7.20	Filter media				
7.21	Drainage layer: supply and place 300mm thick layer of approved coarse gravel size 20-32mm as shown on the drawings.	m ³	10.2		-
7.22	Transition layer: supply and place 100mm thick layer of approved medium gravel size 10-14mm as shown on the drawings.	m ³	4.6		-
7.23	Filtration layer: supply and place (as per drawings) 350mm thick layer of approved sieved and washed sand with the following characteristics: - dia 0.2 - 0.7 mm - free of silt - normal particle size distribution	m ³	13.7		-
SUBTOTAL 7					-
TOTAL					-
NOTE: 1. All the rates include 16% VAT 2. All the rates include supply, handling, assembling, installation, deployment of machines, processing (i.e. welding), and all related labour work					

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BILL 3 - ANAEROBIC REACTOR

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
1.00	<u>EARTHWORKS</u>				
	The rates shall include for all strutting, shuttering, stabilizing excavation phases and keeping the excavation free of water by pumping, bailing or other means				
1.10	<u>Top soil removal</u>				
1.11	Bulk excavations and top soil removal for the whole area of ABR (depth n.e. 150mm). Spread top soil stacked on site for reuse. Level and prepare for grassing and landscaping.	m ²	101.2		-
1.20	<u>Excavation for foundation</u>				
	Excavate for foundations, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by the Project Manager				
1.21	Maximum depth n.e. 1.0 m after stripping of top soil	m ³	101.2		-
1.22	ditto, but depth from 1.0m up to 2m	m ³	101.2		-
1.23	ditto, but depth from 2.0m up to 3.0m	m ³	90.7		-
1.24	ditto, but depth from 3.0m up to 4m	m ³	54.4		-
1.25	Disposal of excavated material which cannot be used as backfill material on site. The rates shall include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority	m ³	129.6		-
1.26	Extra over for Items 1.21-1.23 : for excavation in rock Class 'A', blasting not permitted (Provisional), to be approved and directed by the Project Manager	m ³	208.6		-
1.27	-Ditto- for excavation in rock Class 'B', blasting not permitted (Provisional)	m ³	104.3		-
1.28	-Ditto- for excavation in rock Class 'C', blasting not permitted (Provisional)	m ³	34.8		-
1.30	<u>Compaction</u>				
1.31	Provide approved hard core and compact in one layer of 300mm and blinded with sand or gravel	m ³	30.4		-
SUBTOTAL 1					-
2.00	<u>SUBSTRUCTURE: CONCRETE / REINFORCEMENT/ FORMWORKS</u>				
2.10	<u>Damp-proof membrane</u>				
2.11	Damp-proof membrane, gauge 1000 laid over hard core	m ²	103.3		-
2.20	<u>Concrete</u>				
2.21	Blinding: Provide all materials, mix and place concrete grade C15/20 (1:3:6) for blinding of ground slab, mixing to be done using a concrete mixer approved to be suitable for the type of works by the Project Manager	m ²	105.1		-
2.22	Footing: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)	m ³	0.4		-
2.23	Ground slab: Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for ground slab, mixing to be done using a concrete mixer approved to be suitable for the type of works by the Project Manager	m ³	21.0		-

BILL 3 - ANAEROBIC REACTOR					
ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
2.24	Columns: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)	m ³	2.6		-
2.25	Beams: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)	m ³	1.0		-
2.26	Base slab of the siphon chamber: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)		1.4		-
2.30	<u>Reinforcement</u>				
2.31	Provide all materials as specified below and fix at sites; fabric reinforcement no. A142 mesh size 150 x 150mm weighing 2.22 kg per m2, including bends, tying wire and spacer blocks; fabric reinforcement with minimum 150mm wide side and end laps, laid in bed	m ²	105.1		-
2.32	Provide reinforcement - deformed high yield steel Y10 bars	Kg	678.0		-
2.40	<u>Finishing</u>				
2.41	Screed the ground slab with water proof cement mortar 1:3	m ²	83.5		-
2.50	<u>Formwork</u>				
	Provide and fix shuttering including propping, strutting and striking, all as specified				
2.51	Wrot Formwork - Class F3 Finish				
2.511	Sides of beams	m ²	49.9		-
SUBTOTAL 2					-
3.00	<u>WALLING</u>				
3.10	<u>Natural stone wall</u>				
	Natural stone block walling, medium chisel dressed, reinforced with 20 swg hoop iron at every third course, and bedded, jointed and bonded in cement mortar (1:3)				
3.11	200 mm Walling	m ²	266.3		-
3.20	<u>Supporting edge</u>				
3.21	200mm PCC supporting wall for the anaerobic filter media		1.59		-
3.30	<u>Plaster and Rendering</u>				
3.31	Plaster internally and externally with water proof cement mortar 1:3	m ²	532.6		-
SUBTOTAL 3					-
4.00	<u>SUPERSTRUCTURE: CONCRETE / REINFORCEMENT/ FORMWORKS</u>				
4.10	<u>Concrete</u>				
4.11	Beams: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)	m ³	5.6		-
4.12	Suspended roof slab for Settler, ABR Tank and siphon chamber: Provide all materials, mix, place and compact concrete grade C20 (1:1.5:3)	m ³	13.7		-
4.13	Provide and install reinforced fibre covers 600mm x 450mm with a frame and fitted with a handle (inlet and outlet chamber)	nr	22		-

BILL 3 - ANAEROBIC REACTOR

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
4.14	Provide all material and fabricate reinforced precast concrete covers of 400x700x40mm with a 40x40mm angle frame connected with the welded mesh as per drawings. Allow for two metal handles per cover with a minimum of 100mm length and 40mm height. Apply 1 coat of primer and 2 coats of approved gloss paint to all metal parts. Allow for recess of 30x30mm on either side of the distribution trenches wall as per drawings.	nr	22		-
4.20	<u>Reinforcement</u>				
4.21	Provide reinforcement - deformed high yield steel Y10 bars	Kg	1688.0		-
4.30	<u>Formwork</u>				
	Provide and fix shuttering including propping, strutting and striking, all as specified				
4.31	Sawn Formwork - Class F1 Finish				
4.311	Horizontal soffits of suspended slabs	m ²	91.4		-
4.32	Wrot Formwork - Class F3 Finish				
4.321	Sides of beams	m ²	9.1		-
SUBTOTAL 4					-
5.00	<u>PIPEWORK - PIPES and FITTINGS</u>				
5.10	<u>Pipes</u>				
	Supply, transport to site and store in secure place, including jointing material, bolts, gaskets, packing, jointing glues, etc. as applicable. Install, test and commission.				
5.11	100mm dia. class 41 uPVC pipe (inlet and AF outlet down pipes)	m	5.2		-
5.12	100mm dia. class 41 uPVC pipe (ABR and AF compartments down pipes)	m	255.94		-
5.13	150mm dia. Class 41 uPVC (for the siphon drainage chamber outlet to the inlet chamber of the VFCW)	m	10		-
5.14	100mm dia. 2000mm long uPVC Pipe for vent pipe, with three coats of gloss paint, PVC wire gauze, vent cap, all fittings (two bend and one tee) and a 1000mm high protective concrete stub as per details in Drg	nr	1		-
5.20	<u>Fittings and Valves</u>				
5.21	100x100mm dia. uPVC class 41 Equal tee (for inlet, ABR, AF and outlet down pipes)	nr	95		-
5.22	50mm dia. uPVC pipe 200mm long (sleeve for aeration holes in the ABR chambers)	nr	32		-
5.23	150mm dia uPVC pipe 200mm long (sleeve for overflow pipe in the siphon chamber)	nr	1		-
5.30	<u>Pipe laying</u>				
	The rate quoted shall be deemed to include, supply, transport to site, storage, excavation, laying, jointing and backfilling with selected excavated material in pipe trenches. The rates shall include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority				
	uPVC Flexible Jointed Pipes Nominal Diameter 150mm				
5.31	Outlet pipe connecting the siphon chamber outlet to the VFCW inlet at a depth n.e. 1.5m	m	10		-
5.40	<u>Siphon</u>				

BILL 3 - ANAEROBIC REACTOR					
ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
5.41	Supply and install the siphon system fabricated by Nairobi IronMongers Ltd or other approved suppliers, to details provided in the drg	item	1s		-
SUBTOTAL 5					-
6.00	<u>FILTER MEDIA</u>				
6.10	<u>Filter media</u>				
6.11	Anaerobic filter material: supply and place 1200mm thick layer of approved aggregates size 30-42mm as shown on the drawings	m ³	11.6		-
6.20	<u>Precast concrete slab</u>				
6.21	Supply material, fabricate and place precast concrete slab class 20/20 finished fair 875mm x 500mm x 100mm reinforced by Y10 bars both ways, perforated to details shown on the drawings.	nr	44		-
SUBTOTAL 6					-
TOTAL					-
NOTE:					
1. All the rates include 16% VAT					
2. All the rates include supply, handling, assembling, installation, deployment of machines, processing (i.e. welding), and all related labour work					

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BILL 4 - VERTICAL FLOW CONSTRUCTED WETLANDS

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
1.00	<u>EARTHWORKS</u>				
	The rates shall include for all strutting, shuttering, stabilizing excavation phases and keeping the excavation free of water by pumping, bailing or other means				
1.10	<u>Top soil removal</u>				
1.11	Bulk excavations and top soil removal for the whole area of VFCW (depth n.e. 150mm). Spread top soil stacked on site for reuse. Level and prepare for grassing and landscaping.	m ²	353.9		-
1.20	<u>Excavation</u>				
	Excavate, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by project manager				
1.21	Maximum depth n.e. 1m after stripping of top soil	m ³	265.4		-
1.22	Disposal of excavated material which cannot be used as backfill material on site. The rates shall include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority	m ³	168.1		-
1.23	Extra over for Items 1.21-1.22: for excavation in rock Class 'A', blasting not permitted (Provisional), to be approved and directed by the Project Manager	m ³	159.3		-
1.24	-Ditto- for excavation in rock Class 'B', blasting not permitted (Provisional)	m ³	79.6		-
1.25	-Ditto- for excavation in rock Class 'C', blasting not permitted (Provisional)	m ³	26.5		-
1.30	<u>Embankment</u>				
1.31	Use excavated material to form embankment 250mm high with a top base of 600mm width and a 1:2 slope on either side. Allow for compaction to 95% MDD using approved material to the satisfaction of the project manager	m ³	23.7		-
1.40	<u>Compaction</u>				
1.41	Compact using approved material to the right formation level with a slope of 1% toward the drainage channel for each bed as shown in drawings	m ²	284		-
1.42	Provide approved hard core and compact in one layer of 250mm and blinded with sand or gravel at the drainage channel level	m ³	2.2		-
SUBTOTAL 1					-
2.00	<u>CONCRETE / REINFORCEMENT/ FORMWORKS</u>				
2.10	<u>Damp-proof membrane</u>				
2.11	Damp-proof membrane, gauge 1000 laid over hard core (drainage channel)	m ²	8.9		-
2.20	<u>Concrete</u>				
2.21	Blinding: Provide all materials, mix and place concrete grade C15/20 (1:3:6) for blinding of ground slab (drainage channel), mixing to be done using concrete mixer approved to be suitable for the type of works by the Project Manager	m ²	8.9		-
2.22	Ground slab (drainage channel): Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for ground slab, mixing to be done using concrete mixer approved to be suitable for the type of works by the project manager	m ³	1.3		-
2.30	<u>Reinforcement</u>				
2.31	Provide all materials as specified below and fix at sites; fabric reinforcement no. A142 mesh size 150 x 150mm weighing 2.22 kg per m2, including bends, tying wire and spacer blocks; fabric reinforcement with minimum 150mm wide side and end laps, laid in bed	m ²	8.9		-
2.40	<u>Finishing</u>				
2.41	Screed the ground slab (drainage channel) with water proof cement mortar 1:3. Allow for carrying out benching with a slope of 1:4 towards the central channel as per drawings.	m ²	8.9		-

BILL 4 - VERTICAL FLOW CONSTRUCTED WETLANDS

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
2.50	<u>Precast concrete covers</u>				
2.51	Provide all material and fabricate reinforced precast concrete covers of 700x400x40mm with a 40x40mm angle frame connected with the welded mesh as per drawings. Allow for two metal handles per cover with a minimum of 100mm length and 40mm height. Apply 1 coat of primer and 2 coats of approved gloss paint to all metal parts. Allow for recess of 50x50mm on either side of the wall as per drawings.	nr	22		-
SUBTOTAL 2					-
3.00	<u>WALLING</u>				
3.10	<u>Natural stone wall</u>				
	Natural stone block walling, medium chisel dressed, reinforced with 20 swg hoop iron at every third course, and bedded, jointed and bonded in cement mortar (1:3)				
3.11	200mm walling	m ²	23.0		-
3.20	<u>Plaster</u>				
3.21	Plaster internally and externally with water proof cement mortar 1:3	m ²	46.1		-
SUBTOTAL 3					-
4.00	<u>PIPEWORK - PIPES and FITTINGS</u>				
4.10	<u>Pipes</u>				
	Supply, transport to site and store in secure place, jointing material, bolts, gaskets, packing, jointing glues, etc. as applicable. Install as per drawings, level, test and commission				
4.11	100mm dia. class 41 uPVC pipe (distribution pipe)	m	20.6		-
4.12	60mm dia. class 41 uPVC pipe (intermediate distribution pipe)	m	24.2		-
4.13	40 mm dia. dia. class 41 uPVC pipe (feeding pipes)	m	204		-
4.14	100mm dia. class 41 uPVC drain pipes	m	212.8		-

BILL 4 - VERTICAL FLOW CONSTRUCTED WETLANDS

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
4.15	100mm dia. class 41 uPVC outlet pipe (from the drain channel to the discharge point)		10		-
4.16	Provide all materials and perforate the pipes supplied under item 4.13. (feeding pipes) Perforation shall be holes of 10mm diameter at 300mm centre to centre spacing. The holes are placed on two parallel lines located at a 30° angle from the central line as per drawings	m	204		-
4.17	Provide all materials and perforate the pipes supplied under item 4.14. (drain pipes). Perforation shall be holes of 10mm diameter at 100mm centre to centre spacing. The holes are placed on two parallel lines located at a 30° angle from the central line as per drawings	m	212.8		-
4.18	Sealing of each opening (bitumen, welding or brackets) for the drain pipe to pass through the PE liner to reach the drain channel	pc	14		-
4.20	Fittings and Valves				
4.21	150x150mm equal tee to connect the inlet pipe to the ballcock valves	nr	2		-
4.22	150mm dia. PVC Ball Cock valve	nr	2		-
4.23	150mm dia. PVC end cap to connect to the socket end of the bypass pipe in the drainage channel.	nr	1		-
4.24	150mm PVC elbow		2		-
4.25	150x150mm PVC equal tee	nr	2		-
4.26	150x100mm PVC reducer	nr	4		-
4.27	100x40mm PVC reducing tee	nr	24		-
4.28	100mm PVC end caps to place at each end of the 2 last reducing tee 100x40mm	nr	4		-
4.29	40mm dia. PVC end cap	nr	24		-
4.30	Pipe laying				
	The rate quoted shall be deemed to include, supply, transport to site, storage, excavation, laying, jointing and backfilling with selected excavated material in pipe trenches. The rates shall include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority				
	uPVC Flexible Jointed Pipes Nominal Diameter 100mm				
4.31	Outlet pipe from the VFCW drainage channel to the discharge point at a depth n.e. 1.5m	m	10		-
SUBTOTAL 4					-
5.00	<u>FILTER MEDIA AND PLANTS</u>				
5.10	<u>PE liner</u>				
5.11	Supply and place the 1mm thick PE liner as shown on the drawing. Allow for welding of joints between two sheets using hot wedge welding machine (where applicable)	m ²	324		-
5.20	<u>Filter media</u>				
5.21	Drainage layer: supply and place approved 100mm thick layer of approved coarse gravel size 20-32mm as shown on the drawings.	m ³	19.1		-
5.22	Transition and distribution layer: supply and place approved 2 x 100mm thick layer of approved medium gravel size 10-14mm as shown on the drawings.	m ³	45.8		-
5.23	Filtration layer: Supply and place (as per drawings) 450mm thick layer of approved sieved and washed sand with the following characteristics: - dia 0.2 - 0.7 mm - free of silt - normal particle size distribution	m ³	102.96		-
5.30	<u>Plants</u>				
5.31	Supply and plant common reeds (PHRAGMITES AUSTRALIS) or other local aquatic plant: 4 shoots per square metre. Allow for 3 months of nursing before planting and once planted maintenance until commissioning	item	ls		-
SUBTOTAL 5					-
TOTAL					-

NOTE:
1. All the rates include 16% VAT
2. All the rates include supply, handling, assembling, installation, deployment of machines, processing (i.e. welding), and all related labour

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BILL 5 - SOLID WASTE INCINERATOR

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
1.00	<u>EARTHWORKS</u>				
	The rates shall include for all strutting, shuttering, stabilizing excavation phases and keeping the excavation free of water by pumping, bailing or other means				
1.10	<u>Top soil removal</u>				
1.11	Bulk excavations and top soil removal for the whole area of CA (depth n.e. 150mm). Spread top soil stacked on site for reuse. Level and prepare for grassing and landscaping.	m ²	9.86		-
1.20	<u>Excavation for foundation</u>				
	Excavate for foundations, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by the Project Manager				
1.21	Maximum depth n.e. 0.9 m after stripping of top soil	m ³	7.14		-
1.22	Disposal of excavated material which cannot be used as backfill material on site. The rates shall include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority	m ³	4.607		-
1.23	Extra over for Items 2.21 - 2.22: for excavation in rock Class 'A', blasting not permitted (Provisional), to be approved and directed by the Project Manager	m ³	4.284		-
1.24	-Ditto- for excavation in rock Class 'B', blasting not permitted (Provisional)	m ³	2.142		-
1.25	-Ditto- for excavation in rock Class 'C', blasting not permitted (Provisional)	m ³	0.714		-
1.30	<u>Compaction</u>				
1.31	Provide approved hard core and compact in layers of 200mm	m ³	1.7		-
SUBTOTAL 1					-
2.00	<u>CONCRETE / REINFORCEMENT/ FORMWORKS</u>				
2.10	<u>Damp-proof membrane</u>				
2.11	Damp-proof membrane, gauge 1000 laid over hard core	m ²	8.5		-
2.20	<u>Concrete</u>				
2.21	Footing: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)	m ³	1.248		-
2.22	Blinding: Provide all materials, mix and place concrete grade C15/20 (1:3:6) for blinding of strip footing, mixing to be done using concrete mixer approved to be suitable for the type of works by the engineer	m ²	42.5		-
2.23	Ground slab: Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for ground slab 150mm high, mixing to be done using concrete mixer approved to be suitable for the type of works by the engineer	m ³	1.125		-
2.24	Plinth for the incinerator unit: Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for plinth 150mm high, mixing to be done using concrete mixer approved to be suitable for the type of work by the project manager.	m ³	0.225		-
2.25	Deck: Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for plinth 75mm high, mixing to be done using concrete mixer approved to be suitable for the type of work by the project manager.	m ³	0.249075		-
2.30	<u>Reinforcement</u>				
2.31	Provide all materials as specified below and fix at sites for ground slab, plinth and decks; fabric reinforcement no. A142 mesh size 150 x 150mm weighing 2.22 kg per m ² , including Bends, tying Wire and spacer blocks; fabric reinforcement with minimum 150mm wide side and end laps, laid in bed	m ²	12.321		-
2.40	<u>Formwork</u>				
	Provide and fix shuttering including propping, strutting and striking, all as specified Sawn Formwork - Class F1 Finish				
2.41	Sides of ground slab	m	11		-

BILL 5 - SOLID WASTE INCINERATOR

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
2.42	Sides of the plinths	m	5		-
2.43	Horizontal soffits of suspended slab (for the 2 decks)	m ²	3.321		-
2.50	Finishing				
2.51	Screed ground slab with water proof cement mortar 1:3 with a slope of 1% towards the door side where a channel is leading the drained water outside	m ²	7.5		-
SUBTOTAL 2					-
3.00	INCINERATOR				
3.10	Provide all materials: fire bricks, fire cement, ballast, sand, hinges, steel angle, steel channel RHS and flat sheet. Construct solid waste incinerator as specified in the drawing and plaster the external walls. Provide, connect and paint (quality gloss) 4m high DN150 steel pipe as chimney as per drawings. Fabricate, paint (quality gloss) and install steel top frame, cover, ash door and fire grate as per drawings	item	1s		-
SUBTOTAL 3					-
4.00	WALLING				
4.10	Natural stone wall				
	Natural stone block walling, medium chisel dressed, reinforced with 20 swg hoop iron at every third course, and bedded, jointed and bonded in cement mortar (1:3)	m ²			-
4.11	200 mm Walling	m ²	10.1		-
4.12	Strip walling	m ²	5.5		-
4.20	Plaster and Rendering				
4.21	Plaster internally and externally with water proof cement mortar 1:3	m ²	20.2		-
SUBTOTAL 4					-
5.00	PIPEWORK - PIPES and FITTINGS				
	Supply and install:				
5.10	Pipes				
5.11	uPVC 150mm dia. rain gutter complete with accessories (e.g. union, end cap)	m	8.00		-
5.12	uPVC 75mm down pipe with appropriate elbows	m	5.00		-
SUBTOTAL 5					-
6.00	METAL WORKS				
6.10	Steelwork for columns				

BILL 5 - SOLID WASTE INCINERATOR

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
6.11	Supply and fix 75mmx75mmx3mm thick and 3200mm long SHS column with fish tail lugs embedded in column footing as per drawings. Allow for welding of a 100x3mm U-shape steel sheet on top of the column to accommodate wall plate.	nr	6		-
6.20	Wire mesh				
6.21	Supply and install 50x50mm welded mesh to be welded to the steel column all around the incinerator shed	m ²	18		-
6.30	Chimney support				
6.31	Supply and install 5mm thick steel cables from the roof of the shed to the top of the chimney	m	20		-
6.40	Steel Door				
	Supply and fix steel casement door with 50 x 50mm pressed metal frames, including hinges, pad bolts and tower bolts, all to manufacturer's details, with one coat lead oxide primer complete with opening accessories including bedding and and pointing around frames in cement mortar				
6.41	Door size 900 x 2100 mm high	nr	1		-
SUBTOTAL 6					-
7.00	ROOFING				
7.10	Roofing sheets				
7.11	IT4 (box profile) roofing sheets with resin coat laid on sawn cypress (Grade 2) battens size 100 x 50mm pressure impregnated with approved preservative	m ²	13.2		-
7.20	Carpentry and joining				
	Roof Timbers: double pitch roof truss and overhanging canopy in sawn cypress grade II seasoned and pressure impregnated with wood preservative and timber joints with bolted and nailed connections as per the drawings				
7.21	Equal truss 2500mm clear span and 650mm high with 450mm eaves projection, in 100 x 50mm rafters and 100 x 50mm struts and ties with a spacing of 1500 mm C/C	nr	3		-
	Other Roof Members: Sawn cypress grade II maximum moisture content 12% seasoned and pressure impregnated with wood preservative and timber joints with bolted and nailed connections as per drawings				
7.22	100 x 50mm purlins	m	24		-
7.23	100 x 50mm wall plate tied to wall with 20 s.w.g. hoop iron at 900mm centres	m	7.5		-
7.24	200 x 40mm fascia board	m	16.8		-
SUBTOTAL 7					-
8.00	PAINTING AND DECORATING				
8.10	Painting				
	Prepare, knot, prime, stop and apply three coats first quality gloss paint				
8.11	General surfaces of fascia boards	m ²	3.36		-
8.12	General surfaces of steel columns	item	ls		-
8.13	General surfaces of steel casement door	item	ls		-
SUBTOTAL 8					-
9.00	PCC SLABS				
9.10	Provide all material, fabricate and place PCC slabs 600x600mm in front of the incinerator shed and allow for preparation of the bedding including all required earthwork	m ²	1.8		-
SUBTOTAL 09					-
TOTAL					-
NOTE: 1. All the rates include 16% VAT 2. All the rates include supply, handling, assembling, installation, deployment of machines, processing (i.e. welding), and all related labour work					

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BILL 6 - OPERATOR STORE

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
1.00	<u>EARTHWORKS</u>				
	The rates shall include for all strutting, shuttering, stabilizing excavation phases and keeping the excavation free of water by pumping, bailing or other means				
1.10	<u>Top soil removal</u>				
1.11	Bulk excavations and top soil removal for the whole area of operator store bed (depth n.e. 150mm)	m ²	22.2		-
1.20	<u>Excavation for foundation</u>				
	Excavate for foundations, part backfill after construction and remainder, cart away to tips or use as fill on site, all as directed by the Project Manager				
1.21	Maximum depth n.e. 1.2 m after stripping of top soil	m ³	16.668		-
1.22	Disposal of excavated material which cannot be used as backfill material on site. The rates shall include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority	m ³	10.6		-
1.23	Extra over Items : for excavation in rock Class 'A', blasting not permitted (Provisional), to be approved and directed by the engineer	m ³	10.0		-
1.24	-Ditto- for excavation in rock Class 'B', blasting not permitted (Provisional)	m ³	5.0		-
1.25	-Ditto- for excavation in rock Class 'C', blasting not permitted (Provisional)	m ³	1.7		-
1.30	<u>Compaction</u>				
1.31	Provide approved hard core and compact in layers of 200mm	m ³	5.99		-
SUBTOTAL 1					-
2.00	<u>SUBSTRUCTURE: CONCRETE / REINFORCEMENT/ FORMWORKS</u>				
2.10	<u>Concrete</u>				
2.11	Blinding: Provide all materials, mix and place concrete grade C15/20 (1:3:6) for blinding of strip footing, mixing to be done using concrete mixer approved to be suitable for the type of works by the engineer	m ²	11.3		-
2.12	Footing: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)	m ³	2.3		-
2.13	Ground slab: Provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3) for ground slab, mixing to be done using concrete mixer approved to be suitable for the type of works by the engineer	m ³	2.8		-
2.20	<u>Reinforcement</u>				
2.21	Provide all materials as specified below and fix at sites; fabric reinforcement no. A142 mesh size 150 x 150mm weighing 2.22 kg per m2, including bends, tying wire and spacer blocks; fabric reinforcement with minimum 150mm wide side and end laps, laid in bed	m ²	18.6		-
2.22	Provide reinforcement - deformed high yield steel Y10 bars	Kg	74.5		-
2.30	<u>Formwork</u>				

BILL 6 - OPERATOR STORE

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
2.31	Provide and fix shuttering including propping, strutting and striking, all as specified				
2.32	Sides of ground slab	m	17.3		-
SUBTOTAL 2					-
3.00	<u>WALLING</u>				
3.10	<u>Natural stone wall</u>				
	Natural stone block walling, medium chisel dressed, reinforced with 20 swg hoop iron at every third course, and bedded, jointed and bonded in cement mortar (1:3)				
3.11	200mm thick walling	m ²	51.5		-
3.12	Strip walling	m ²	13.8		-
3.20	<u>Damp-proof course</u>				
3.21	Damp-proof membrane, gauge 1000 laid over hard core	m ²	18.6		-
3.22	Bituminous felt damp-proof course under 200mm wide walls	m	17.3		-
3.30	<u>Plaster and Rendering</u>				
3.31	Plaster walls internally and external wall above the ring beam with 12.5mm Thick Gauged Cement ratio 1:3	m ²	69.7		-
SUBTOTAL 3					-
4.00	<u>SUPERSTRUCTURE: CONCRETE / REINFORCEMENT/ FORMWORKS</u>				
4.10	<u>Concrete</u>				
4.11	Beams: provide all materials, mix, place and compact concrete grade C25/20 (1:1.5:3)	m ³	0.8		-
4.20	<u>Reinforcement</u>				
4.21	Provide reinforcement - deformed high yield steel Y10 bars	Kg	236		-
4.30	<u>Formwork</u>				
	Provide and fix shuttering including propping, strutting and striking, all as specified. Wrot Formwork - Class F3 Finish				
4.31	Sides for beams	m ²	13.5		-
SUBTOTAL 4					-
5.00	<u>PIPEWORK - PIPES and FITTINGS</u>				
5.10	<u>Pipes</u>				
5.11	Provide all materials and install internal waste water drainage for the hand wash basin, the WC and the shower, to be connected to the inspection chamber outside the building	item	1s		-
5.12	Provide and lay 100mm dia. Class 41 uPVC sewer pipe from the inspection chamber to the next treatment module	m	10		-

BILL 6 - OPERATOR STORE

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
5.13	Provide 25mm dia. HDPE water pipe and construct pipeline from the existing service line to the operator store through the overhead tank, incl. all required fittings. Allow for connection of the HDPE pipe to the service line with all appropriate fittings.	item	1s		-
5.14	Provide and install 15mm dia. HDPE water pipe in the washroom of the operator store, including all required fittings for connection and chasing all pipes within the wall and make good after	item	1s		-
5.20	<u>Supplementary parts</u>				
	Provide and install the following complete with associated pipework and fittings				
5.21	Glazed ceramic wash hand basin	nr	1		-
5.22	Glazed Ceramic water closet	nr	1		-
5.23	Shower: instant shower head(Lorenzeti or equivalent) and 15mm dia. water tap	item	1s		-
SUBTOTAL 5					-
6.00	<u>METALWORK</u>				
6.10	<u>Steel tower</u>				
6.11	Provide all material and construct a 3000mm high steel tower as specified in the drawings. Allow for excavating and placing of 4 nr class 25/20 concrete footing size 400x400x600mm deep as per drawings	item	LS		-
6.20	<u>Steel Door</u>				
	Supply and fix steel casement door with 50 x 50mm pressed metal frames, including hinges, pad bolts and tower bolts, all to manufacturer's details, with one coat lead oxide primer complete with opening accessories including bedding and and pointing around frames in cement mortar				
6.21	Door size 900 x 2100 mm high	nr	2		-
6.30	<u>Steel Casement Windows</u>				
	Supply and fix the following standard section horizontal bar type steel casement windows with one coat lead oxide primer complete with opening accessories including burglar proofing bedding and pointing around frames in cement mortar				
6.31	Window size 1200 x 1200mm high	nr	2		-
6.32	Window size 600 x 600mm high	nr	2		-
6.40	<u>Glazing</u>				
	4mm thick clear sheet glass and glazing to steel casements with putty in panes				
6.41	0.10 - 0.50 square metres	m ²	4.8		-
SUBTOTAL 6					-
7.00	<u>ROOF COVERINGS</u>				
7.10	<u>Roofing sheets</u>				

BILL 6 - OPERATOR STORE

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
7.11	IT4 (box profile) roofing sheets with resin coat laid on sawn cypress (Grade 2) battens size 100 x 50mm pressure impregnated with approved preservative	m ²	35.0		-
7.20	<u>Carpentry and joining</u>				
7.21	Roof Timbers: mono pitch roof truss and overhanging canopy in sawn cypress grade II seasoned and pressure impregnated with wood preservative and timber joints with bolted and nailed connections as per the drawings				
7.22	Equal truss 4000mm clear span and 750mm high with 600mm eaves projection, in 100 x 50mm rafters and 100 x 50mm struts and ties with a spacing of 1500 mm C/C	nr	4		-
7.23	Other Roof Members: Sawn cypress grade II maximum moisture content 12% seasoned and pressure impregnated with wood preservative and timber joints with bolted and nailed connections as per drawings				
7.24	100 x 50mm purlins	m	16		-
7.25	100 x 50mm wall plate tied to wall with 20 s.w.g. hoop iron at 900mm centres	m	17.3		-
7.26	200 x 40mm fascia board	m	22.1		-
7.30	<u>Ceiling</u>				
7.31	Provide and fix 9mm chipboard ceiling fixed on 600x600mm branderling (50x50mm). Allow for 1nr 600x600mm access hatch with cover	m ²	18.6		-
7.32	50mm high cornice	m	25.3		-
7.40	<u>Timber Battern Door</u>				
7.41	50mm thick lipped timber battern door 900x2100mm high made of 100x50mm seasoned timber including hinges, ironmongery, frame and galvanised metal sheet (1m high) at the bottom of the door	nr	1		-
SUBTOTAL 7					-
8.00	<u>PAINTING AND DECORATING</u>				
8.10	<u>Painting</u>				
	Prepare, knot, prime, stop and apply three coats first quality emulsion paint				
8.11	Plastered surfaces internally	m ²	64.4		-
8.12	Under side of the ceiling	m ²	18.6		-
8.13	Prepare, knot, prime, stop and apply three coats first quality gloss paint				
8.14	General surfaces of fascia boards	m ²	4.4		-
8.15	General surfaces of glazed metal windows, including burglar-proofing	item	ls		-
8.16	General surfaces of steel casement door and flush door	item	ls		-
8.20	<u>Tiling</u>				
	Supply and fix tiles on the floor and walling up to 1.2m high for the toilet area				

BILL 6 - OPERATOR STORE

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
8.21	Floor tiles for the office and the washroom: 6mm thick ceramic coloured	m ²	16.1		-
8.22	Skirting tiles: 6mm thick and 100mm high ceramic coloured	m ²	2.2		-
8.23	Wall tiles around the washroom to the height of 1500mm: 4mm thick ceramic coloured	m ²	5.3		-
SUBTOTAL 8					-
9.00	<u>PCC SLABS</u>				
9.10	Provide all material, fabricate and place PCC slabs 600x600mm around the operator store and allow for preparation of the bedding including all required earthwork	m ²	26.5		-
SUBTOTAL 9					-
10.00	<u>ELECTRICAL CONNECTION</u>				
10.10	Allow for electrical connection including complete meter connection with meter box (KPLC), compact switch board, wiring and testing of the lighting system for two rooms (office and bathroom), 2 fluorescent bulbs, 2 switch buttons, 3 double electrical sockets and any other installation as to make lighting system operational as specified in the technical specifications or approved equivalent	ls	1		-
SUBTOTAL 10					-
11.00	<u>WATER SUPPLY</u>				
11.10	Supply and installation of a 1000L water tank on a steel tower	ls	1		-
SUBTOTAL 11					-
TOTAL					-

NOTE:

1. All the rates include 16% VAT

2. All the rates include supply, handling, assembling, installation, deployment of machines, processing (i.e. welding), and all related labour work

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BILL 7 - SITE AND AUXILIARY WORKS

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	RATE [KSh]	AMOUNT [KSh]
1.00	<u>SITE CLEARANCE AND GENERAL EXCAVATION</u>				
1.10	<u>General Clearance</u>				
1.11	Clear area within the DTF site of all grass, bushes, shrubs, hedges and grub up roots	m ²	2025		-
1.20	<u>Removal of trees and stumps</u>				
1.21	Tree of girth: up to 500mm (provisional)	nr	2		0
1.22	Tree of girth: 500mm - 1m (provisional)	nr	1		0
	Note:- Girth shall be measured 1.0 m above the ground level Trees to remove to be identified by the Project Manager				
1.30	<u>Landscaping and grass planting</u>				
1.31	Allow for trimming of site to correct slopes and use excavated material as fill and cart-away remaining material to approved tips	item	1s		-
1.32	Provide and plant approved grass and maintain until it takes roots	m ²	1015		-
1.40	<u>Surface water drainage</u>				
1.41	Excavate earth drain to the lines and levels directed by the project manager. Depth to invert not exceeding 0.5m	m	150		-
SUBTOTAL 1					-
2.0	<u>DISPOSAL OF DEBRI</u>				
2.10	Re-use debri from demolished existing reinforced concrete structures as granular fill to foundations. Compact in layers ne 200mm	Item	LS		
2.20	Cart away debris from demolished existing reinforced concrete structures to tips as identified by the contractor with the local authorities and approved by the Project Manager. Distance of haulage ne 5Km	Item	LS		
					-
SUBTOTAL 2					-
3.0	<u>GABION AND STONE PITCHING WORKS AND LANDSCAPING</u>				
3.10	Excavate along river embankment and river bed for the laying of gabions from the existing ground level to the bottom of embankment to approval of Engineer. Depth n.e. 3.0m including disposal of surplus material	m ³	250		
3.20	100 mm thick stone pitching to slopes of drain , upto 600 mm deep each side, with approved selected stone around BR and ABR Modules	m ²	250		
	Landscape (light Earth-works), top soil with approved soil, plant and maintain approved grass at designated area for slope protection	m ²	800		
3.30	Provide all materials and carry out laying of 1m x 1m x 2m Maccaferri or approved equivalent galvanized gabions laid in stretches with 0.5m overlap, mesh wire diameter 2.0mm, include for tying of adjacent gabions with approved wire	m ³	750		
3.40	Provide 150mm approved hardcore as fill in gabions	m ³	700		-
3.50	Provide 150mm thick stone pitching and grout with mortar as specified or as directed by the engineer	m ²	400		
SUBTOTAL 3					-

4.0	CHAMBERS				
	Provide and construct chambers as described below. The rates quoted shall include site clearance, excavation, disposal of excavated material, backfilling, compacting and fixing of all inlet, outlet at the bottom of chamber, including haunching works and smooth finishing etc. as specified and instructed by the project manager				
4.10	Detached inspection chamber (SDB + VFCW + Site): internal dimension 1000 x 1000 mm up to a depth n.e. 3000 mm including base slab, haunching, masonry walling 150mm thick, plastering internal and external, proper finishing and a cover slab 150mm thick with a rectangular 900mm x 900mm reinforced fibre access cover including a frame and fitted with a handle	pcs	7		-
SUBTOTAL 4					-
5.00	FENCING AND GATE				
5.10	Provide all materials and construct metal gate 6.0 m wide with 1 Nr 915 mm wide pedestrians entrance door within the gate, including 2 Nr pillars with column all as detailed on drawing, inclusive of painting with undercoating and finish coating	pcs	1		-
5.20	Excavate for 3425mm long post holes (2700mm overground and 725mm underground), provide all materials and construct chain link fence to be gauge 12 galvanized steel wire double twist with 3 strands of gauge 16 barbed wire on concrete posts at 3 m centres all as per details on drawings provided including straining posts at every 10th post and additional posts at corners	m	174		-
SUBTOTAL 5					-
6.00	ROADS				
6.10	Gravel access road within the DTF				
6.11	Bulk excavations and top soil removal for the whole area of the road (depth n.e. 250mm). Spread top soil stacked on site for reuse.	m ²	405		-
6.12	Existing formation compacted to 95% MDD as shown in the drawing	m ²	405		-
6.13	150mm hard core fill compacted base as shown in the drawing	m ²	405		-
6.14	Supply and place approved 150mm thick crusher-run gravel shown on the drawings.	m ²	405		-
SUBTOTAL 6					-
7.00	TESTING OF SYSTEM				
7.10	Allow for test running of the facility by filling all the relevant modules (balancing tank, settler and ABR) with water (200 m ³) and leaving it to stay for at least 2 days to check the water tightness. Water should then be passed through the entire system to check flow in a typical treatment process from the balancing tank to the outlet of the vertical flow constructed wetland.	item	1s		-
SUBTOTAL 7					-
8.00	SIGN POST				
8.10	Provide and erect on site a project sign board fully labelled complying with WSTF guideline 2013, as instructed by the project manager	nr	1	1	1.00
SUBTOTAL 8					1.00
TOTAL					1.00
NOTE: 1. All the rates include 16% VAT 2. All the rates include supply, handling, assembling, installation, deployment of machines, processing (i.e. welding), and all related labour work					

WSTF
URBAN SANITATION UPSCALING PROGRAMM



BILL No	DESCRIPTION	AMOUNT (KSh)
Bill No 1	PRELIMINARY AND GENERAL	0
Bill No 2	RECEIVING BAY / BALANCING TANK / SLUDGE DRYING BED	0
Bill No 3	ANAEROBIC REACTOR	0
Bill No 4	VERTICAL FLOW CONSTRUCTED WETLAND	0
Bill No 5	SOLID WASTE INCINERATOR	0
Bill No 6	OPERATOR STORE	0
Bill No 7	SITE AND AUXILIARY WORKS	1
TOTAL [KSh]		1
		0
GRAND TOTAL INVESTMENT COSTS - All taxes inclusive [KSh]		1