



**AFRICAN DEVELOPMENT BANK
AFRICAN DEVELOPMENT FUND.**



ATHI WATER WORKS DEVELOPMENT AGENCY.

**NAIROBI RIVERS BASIN REHABILITATION AND RESTORATION
PROGRAM: SEWERAGE IMPROVEMENT PROJECT- PHASE 2
(NARSIP-II)**

Bidding Document for Procurement of Works

**LOT 5-CONSTRUCTION OF NAIROBI INFORMAL SETTLEMENTS WATER AND
SANITATION INTENSIFICATION WORKS.**

NATIONAL COMPETITIVE BIDDING (NCB)

NCB No: AWWDA/NaRSIP-II/W-05/2022

Purchaser: ATHI WATER WORKS DEVELOPMENT AGENCY

Country: KENYA

MARCH 2022.

Preface

This Bidding Document for Procurement of Works has been prepared by Athi Water Services Board and is based on the Standard Bidding Document for Procurement of Works issued by the African Development Bank,¹ dated August 2020.

The Standard Bidding Document for Procurement of Works reflects the structure and the provisions of the Master Document for Procurement of Works issued by the Multilateral Development Banks, except where specific considerations within the African Development Bank have required a change.

¹ "Bank" shall mean the African Development Bank, the African Development Fund, the Nigeria Trust Fund, as well as any other funds administered by the African Development Bank, and any or all of these entities, as the context may require.

Table of Contents

Part 1: Bidding Procedures.....	5
Section I - Instructions to Bidders	7
Section II - Bid Data Sheet (BDS).....	35
Section III - Evaluation and Qualification Criteria.....	41
Section IV - Bidding Forms.....	54
Section V - Eligible Countries	109
Section VI - Fraud and Corruption	113
Part 2: Works' Requirements.....	115
Section VII - Works' Requirements	117
Part 3: Conditions of Contract & Contract Forms.....	165
Section VIII - General Conditions of Contract.....	166
Section IX - Particular Conditions of Contract.....	215
Section X - Contract Forms	219

Part 1: Bidding Procedures

Section I - Instructions to Bidders

Table of Contents

A. General.....	9
1. Scope of Bid.....	9
2. Source of Funds	10
3. Fraud and Corruption.....	10
4. Eligible Bidders	10
5. Eligible Materials, Equipment and Services	13
B. Contents of Bidding Document.....	13
6. Sections of Bidding Document	13
7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting.....	14
8. Amendment of Bidding Document	15
C. Preparation of Bids	15
9. Cost of Bidding	15
10. Language of Bid.....	15
11. Documents Comprising the Bid.....	15
12. Letter of Bid and Schedules	16
13. Alternative Bids	16
14. Bid Prices and Discounts	16
15. Currencies of Bid and Payment	18
16. Documents Comprising the Technical Bid	18
17. Documents Establishing the Eligibility and Qualifications of the Bidder.....	18
18. Period of Validity of Bids	19
19. Bid Security	19
20. Format and Signing of Bid.....	21
D. Submission and Opening of Bids.....	21
21. Sealing and Marking of Bids	21
22. Deadline for Submission of Bids	22
23. Late Bids	22
24. Withdrawal, Substitution, and Modification of Bids	22
25. Bid Opening.....	23
E. Evaluation and Comparison of Bids	24
26. Confidentiality	24
27. Preliminary Examination & Clarification of Bids	24
28. Deviations, Reservations, and Omissions.....	25
29. Determination of Responsiveness.....	25
30. Nonmaterial Nonconformities	26
31. Correction of Arithmetical Errors	26

32.	Conversion to Single Currency	27
33.	Margin of Preference	27
34.	Subcontractors.....	27
35.	Evaluation of Bids.....	28
36.	Comparison of Bids	28
37.	Abnormally Low Bids.....	29
38.	Unbalanced or Front-Loaded Bids.....	29
39.	Qualification of the Bidder	29
40.	Successful Bid or Bids	30
41.	Employer's Right to Accept Any Bid, and to Reject Any or All Bids	30
42.	Standstill Period	30
43.	Notification of Intention to Award	30
F.	Award of Contract	31
44.	Award Criteria	31
45.	Notification of Award	31
46.	Debriefing by the Employer.....	32
47.	Signing of Contract	32
48.	Performance Security	32
49.	Adjudicator	33
50.	Procurement Related Complaint	33

Section I - Instructions to Bidders

A. General

1. Scope of Bid

1.1 In connection with the Specific Procurement Notice - Invitation for Bids (IFB), specified in the Bid Data Sheet (BDS), the Employer, as specified **in the BDS**, issues this bidding document for the provision of Works as specified in Section VII, Works' Requirements. The name, identification and number of "whole of the works" hereafter called 'Works' invited under one or more lots (Contracts) or Packages each lot containing one or more 'Works' or each package containing one or more lots of this IFB are **specified in the BDS**.

1.2 Throughout this bidding document:

- (a) the term "in writing" means communicated in written form (e.g. by mail, e-mail, and fax, including if specified **in the BDS**, distributed or received through the electronic-procurement system used by the Employer) with proof of receipt;
- (b) if the context so requires, "singular" means "plural" and vice versa;
- (c) "Day" means calendar day, unless otherwise specified as "Business Day". A Business Day is any day that is an official working day of the Borrower. It excludes the Borrower's official public holidays;
- (d) "**ES**" means environmental and social (including Sexual Exploitation, and Abuse (SEA) and Sexual Harassment (SH));
- (e) "**Sexual Exploitation and Abuse**" "(SEA)" means the following:

"**Sexual Exploitation**" is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another;

"**Sexual Abuse**" is defined as the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;
- (f) "**Sexual Harassment**" "(SH)" is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature by the Contractor's Personnel with other Contractor's or Employer's Personnel;
- (g) "**Contractor's Personnel**" is as defined in Sub- Clause 1 (ii) of the General Conditions of Contract; and
- (h) "**Employer's personnel**" is as defined in GCC Sub-Clause 1 (nn) of the General Conditions of Contract.

A non-exhaustive list of (i) behaviors which constitute SEA and (ii) behaviors which constitute SH is attached to the Code of Conduct form in Section IV.

2. Source of Funds

- 2.1 The Borrower or Recipient (hereinafter called “Borrower”) **specified in the BDS** has received or has applied for financing (hereinafter called “funds”) from the Specific Financing Institution named in the BDS (hereinafter called “the Bank”) in an amount **specified in the BDS**, toward the project named **in the BDS**. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this bidding document is issued.
- 2.2 Payment by the Bank will be made only at the request of the Borrower and upon approval by the Bank, and will be subject, in all respects, to the terms and conditions of the Loan (or other financing) Agreement. The Loan (or other financing) Agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods, equipment, plant, or materials, if such payment or import is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations. No party other than the Borrower shall derive any rights from the Loan (or other financing) Agreement or have any claim to the proceeds of the Loan (or other financing).

3. Fraud and Corruption

- 3.1 The Bank requires compliance with the Bank’s Integrity Framework comprising the African Development Bank Group’s Sanctions Procedures, the Bank’s Whistleblowing and Complaints Policy, the Bank’s Procurement Policy under the Procurement Framework and any other applicable Policies and Procedures including their updates in regard to corrupt and fraudulent practices, as set forth in Section VI.
- 3.2 In further pursuance of this policy, bidders shall permit and shall cause their agents (where declared or not), subcontractors, sub consultants, service providers, suppliers, and their personnel, to permit the Bank to inspect all accounts, records and other documents relating to any prequalification process, bid submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the Bank.

4. Eligible Bidders

- 4.1 A Bidder may be a firm that is a private entity, or a state-owned enterprise or institution, subject to ITB 4.6, or any combination of them in the form of a joint venture, consortium, or association hereinafter called JV, under an existing agreement, or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, consortium or association (JV): a) Unless otherwise **specified in the BDS**, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms; b) The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Bidding process and, in the event the JV is awarded the Contract, during contract execution; c) The maximum number of members proposed in a JV shall not exceed the number **specified in the BDS**, or the number derived from the percentage specified under ITB 4.1 (d), whichever is smaller unless both are equal, in which case anyone shall apply; and d) Participation by value of the contract as share of each of the JV partner (member) shall not be less than the percentage **specified in the BDS**. In case of any

inconsistency between ITB 4.1 c) and ITB 4.1 d) that both cannot be applied simultaneously, the latter shall prevail.

4.2 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this Bidding process, if the Bidder:

- (a) directly or indirectly controls, is controlled by or is under common control with another Bidder; or
- (b) receives or has received any direct or indirect subsidy from another Bidder; or
- (c) has the same legal representative as another Bidder; or
- (d) has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the Bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
- (e) or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the Bid; or
- (f) or any of its affiliates has been hired (or is proposed to be hired) by the Employer or Borrower as Project Manager for the Contract implementation; or
- (g) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project **specified in the BDS** ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm; or
- (h) has a close business or family relationship with a professional staff of the Borrower (or of the project implementing agency, or of a recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the bidding document or specifications of the contract, and/or the Bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Bank throughout the procurement process and execution of the contract.

4.3 A firm that is a Bidder (either individually or as a JV member) shall not participate in more than one Bid, except for permitted alternative Bids. This includes participation as a Subcontractor in other Bids. Such participation shall result in the disqualification of all Bids in which the firm is involved. A firm that is not a Bidder or a JV member may participate as a subcontractor in more than one Bid.

4.4 A Bidder and all parties constituting the Bidder including any subcontractors or suppliers shall have the nationality of an eligible country of the Bank in accordance with the Bank's Procurement Policy for the Bank Group Funded Operation described under the Bank's Procurement Framework, and as listed in Section V, Eligible Countries, subject to the restrictions pursuant to ITB 4.8. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the

provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or sub consultants for any part of the Contract including related Services.

- 4.5 A Bidder that has been sanctioned by the Bank, pursuant to the Bank's Integrity Framework, in accordance with its prevailing sanctions policies and procedures as set forth in the Bank's Integrity Framework as described in Section VI paragraph 2.2 d., shall be ineligible to be prequalified for, bid for, or be awarded a Bank-financed contract or benefit from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall have determined. The list of debarred firms and individuals is available at the electronic address **specified in the BDS**.
- 4.6 Bidders that are state-owned enterprises or institutions in the Employer's Country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Bank, that they (i) are legally and financially autonomous (ii) operate under commercial law, and (iii) are not under supervision of the Employer.
- 4.7 A Bidder shall not be under suspension from Bidding by the Employer as the result of the operation of a Bid-Securing Declaration.
- 4.8 Firms and individuals may be ineligible if so indicated in Section V and (a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or the contracting of works or services required; or (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country, or any payments to any country, person, or entity in that country. When the Works are implemented across jurisdictional boundaries (and more than one country is a Borrower, and is involved in the procurement), then exclusion of a firm or individual on the basis of ITB 4.8 (a) above by any country may be applied to that procurement across other countries involved, if the Bank and the Borrowers involved in the procurement agree.
- 4.9 A Bidder shall provide such documentary evidence of eligibility satisfactory to the Employer, as the Employer shall reasonably request.
- 4.10 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders
- 4.11 A firm that is under a sanction of debarment by the Borrower from being awarded a contract is eligible to participate in this procurement, unless the Bank, at the Borrower's request, is satisfied that the debarment;
- (a) relates to fraud or corruption, and
 - (b) followed a judicial or administrative proceeding that afforded the firm adequate due process.

5. Eligible Materials, Equipment and Services

- 5.1 The materials, equipment and services to be supplied under the Contract and financed by the Bank shall have their country of origin in an eligible country of the Bank in accordance with the Bank's Procurement Policy for Bank Group Funded Operations described under the Bank's Procurement Framework, and as listed in Section V, Eligible Countries, subject to the restrictions specified therein, Eligible Countries, and all expenditures under the Contract will not contravene such restrictions. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment and services.
- 5.2 The nationality of the firm that produces, assembles, distributes, or sells the materials and equipment shall not determine their origin.

B. Contents of Bidding Document

6. Sections of Bidding Document

- 6.1 The bidding document consists of Parts 1, 2, and 3, which include all the sections specified below, and which should be read in conjunction with any Addenda issued in accordance with ITB 8.

PART 1 Bidding Procedures

- Section I - Instructions to Bidders (ITB)
- Section II - Bid Data Sheet (BDS)
- Section III - Evaluation and Qualification Criteria
- Section IV - Bidding Forms
- Section V - Eligible Countries
- Section VI - Fraud and Corruption

PART 2 Works' Requirements

- Section VII - Works' Requirements

PART 3 Conditions of Contract and Contract Forms

- Section VIII - General Conditions of Contract (GCC)
- Section IX - Particular Conditions of Contract (PCC)
- Section X - Contract Forms

- 6.2 The Specific Procurement Notice - Invitation for Bids (IFB) issued by the Employer is not part of this bidding document.
- 6.3 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the bidding document, responses to requests for clarification, the minutes of the pre-Bid meeting (if any), or Addenda to the bidding document in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer shall prevail.

- 6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the bidding document and to furnish with its Bid all information and documentation as is required by the bidding document.

7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting

- 7.1 A Bidder requiring any clarification of the bidding document shall contact the Employer in writing at the Employer's address **specified in the BDS** or raise its inquiries during the pre-Bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received prior to the deadline for submission of Bids within a period **specified in the BDS**. The Employer shall forward copies of its response to all Bidders who have acquired the bidding document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. If so **specified in the BDS**, the Employer shall also promptly publish its response at the web page identified in the BDS. Should the clarification result in changes to the essential elements of the bidding document, the Employer shall amend the bidding document following the procedure under ITB 8 and ITB 22.2.
- 7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
- 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
- 7.4 If so **specified in the BDS**, the Bidder's designated representative is invited to attend a pre-Bid meeting and/or a Site of Works visit. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 7.5 The Bidder is requested, to submit any questions in writing, to reach the Employer not later than one week before the meeting.
- 7.6 Minutes of the pre-Bid meeting, if applicable, including the text of the questions asked by Bidders, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the bidding document in accordance with ITB 6.3. If so **specified in the BDS**, the Employer shall also promptly publish the Minutes of the pre-Bid meeting at the web page **identified in the BDS**. Any modification to the bidding document that may become necessary as a result of the pre-Bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-Bid meeting. Nonattendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.

8. Amendment of Bidding Document

- 8.1 At any time prior to the deadline for submission of bids, the Employer may amend the bidding document by issuing addenda.
- 8.2 Any addendum issued shall be part of the bidding document and shall be communicated in writing to all who have obtained the bidding document from the Employer in accordance with ITB 6.3. The Employer shall also promptly publish the addendum on the Employer's web page in accordance with ITB 7.1.
- 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 22.2.

C. Preparation of Bids

9. Cost of Bidding

- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Bidding process.

10. Language of Bid

- 10.1 The Bid, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Employer, shall be written in the language **specified in the BDS**. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language **specified in the BDS**, in which case, for purposes of interpretation of the Bid, such translation shall govern.

11. Documents Comprising the Bid

- 11.1 The Bid shall comprise the following:

- (a) **Letter of Bid** prepared in accordance with ITB 12;
- (b) **Bill of Quantities or Activity Schedules:** Bill of Quantities or Activity Schedules whichever is **specified in the BDS** completed in accordance with ITB 12 and ITB 14;
- (c) **Bid Security or Bid-Securing Declaration**, in accordance with ITB 19.1;
- (d) **Technical Bid-of Base Bid**;
- (e) **Commercial Terms and Conditions**;
- (f) **Alternative Technical Bid**, if permissible, in accordance with ITB 13;
- (g) **Authorization:** written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.3;
- (h) **Bidder's Eligibility:** documentary evidence in accordance with ITB 17 establishing the Bidder's eligibility to Bid;

- (i) **Qualifications:** documentary evidence in accordance with ITB 17 establishing the Bidder's qualifications to perform the contract if its Bid is accepted;
- (j) **Conformity:** documentary evidence in accordance with ITB 16, ITB 29 and ITB 30, and in support of above sub-paragraphs (d) and (e) of ITB 11.1, as necessary, to establish that the offered Works and Services, and Terms and Conditions of the Bid conform to the requirements and provisions of the bidding document; and
- (k) any other document required **in the BDS**.

11.2 In addition to the requirements under ITB 11.1, Bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the Bid, together with a copy of the proposed Agreement.

11.3 The Bidder shall furnish in the Letter of Bid information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid.

12. Letter of Bid and Schedules

12.1 The Letter of Bid and Schedules shall be prepared using the relevant forms furnished in Section IV, Bidding Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 20.3. All blank spaces shall be filled in with the information requested.

13. Alternative Bids

13.1 Unless otherwise **specified in the BDS**, alternative Bids shall not be considered. If Alternative Bids are permitted, the BDS shall specify which of the following ITB (s) namely, ITB 13.2, ITB 13.3 and ITB 13.4 shall be considered.

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

13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements of the bidding document must first price the Employer's design as described in the bidding document and shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the successful Bidder with the Lowest Evaluated Bid conforming to the basic technical requirements shall be considered by the Employer.

13.4 When **specified in the BDS**, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified **in the BDS** and described in Section VII, Works' Requirements. The method for their evaluation will be stipulated in Section III, Evaluation and Qualification Criteria.

14. Bid Prices and Discounts

- 14.1 The prices and discounts quoted by the Bidder in the Letter of Bid and in the Activity Schedule or Bill of Quantities shall conform to the requirements specified below.
- 14.2 The Bidder shall submit a Bid for the 'Works' described in ITB 1.1 by filling in prices for all items of the Works, as identified in Section IV. Bidding Forms. In case of admeasurement contracts, the Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities and in the case of lump-sum contract based on Activity Schedule, the Bidder shall fill in prices for all activities described in the Activity Schedule. Items or Activities, as the case may be, against which no rate or price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed covered by the rates and prices for other items in the Bill of Quantities or Activity Schedule. An item (in case of Bill of Quantities) or an activity (in case of Activity Schedule) not listed in the priced Bill of Quantities or the priced Activity Schedule, as the case may be, shall be assumed to be not included in the Bid, and provided that the Bid is determined substantially responsive notwithstanding this omission, the average or the highest price of the item or activity, as the case may be, as **specified in the BDS** quoted by substantially responsive Bidders will be added to the Bid price and the equivalent total cost of the Bid so determined will be used for price comparison.
- 14.3 The price to be quoted in the Letter of Bid, in accordance with ITB 12.1, shall be the total price of the Bid, excluding any discounts offered.
- 14.4 The Bidder shall quote any discounts and indicate the methodology for their application in the Letter of Bid in accordance with ITB 12.1, ITB 14.6 and ITB 14.7.
- 14.5 Unless otherwise **specified in the BDS** and the Conditions of Contract, the prices quoted by the Bidder shall be fixed. A Bid submitted with an adjustable price basis shall be treated as nonresponsive and shall be rejected, pursuant to ITB 29. However, if in accordance with the BDS, and the Conditions of Contract, price adjustment is permitted during the performance of the Contract, a Bid submitted with a fixed price basis shall not be rejected unless otherwise **specified in the BDS** and in the latter case, a Bid submitted with fixed price shall be rejected. In specifying price adjustment, the Bidder shall furnish the relevant indices and weightings for the price adjustment formulae in the Schedule of Adjustment Data in Section IV- Bidding Forms and the Employer may require the Bidder to justify its proposed indices and weightings.
- 14.6 As specified in the BDS, bids are being invited for "Works" as a single contract (or as one lot); or for individual lots (contracts) each lot containing one or more 'Works'; or for any combination of lots (packages). Bidders wishing to offer discounts for the award of more than one Contract (lot) shall specify in their Bid the price reductions applicable to each contract (lot) and package as the case may be. Bidders shall fully explain the methodology and calculations for applying such discounts, showing how the reductions are derived and the net amounts of each contract after the application of the offered discounts to individual items. Discounts can be offered only for those items for which the Bidder is required to bid and not for any item where the Employer has included its estimated cost as a fixed sum or a percentage in the Bills of Quantities. Discounts shall be submitted in accordance with ITB 14.4, and ITB 14.6 provided that the Bids for all lots (contracts) are opened at the same time.

- 14.7 Discounts offered shall be clear and without any vagueness or ambiguity to avoid rejection of the bid as no clarification shall be requested or permitted on this account after bid submission. The Employer's decision on a bid's discount will be based on the contents of the bid itself, without recourse to any extrinsic evidence. If in the Employer's opinion, which will be final, a discount offered in the bid: I) is unclear, ambiguous or vaguely presented to the extent that it cannot be either interpreted or applied with reasonable accuracy, the Bid shall be rejected; II) relates to any item of cost for which the Bidder is not required to submit a bid price or the Employer may have indicated the estimated cost e.g. for a provisional sum or contingencies as per the bidding document, then the bid will be evaluated without the application of the discount offered for such item of cost; and III) has minor discrepancy or unclarity which could be interpreted reasonably, the Employer in this case may decide not to reject the bid and apply the discount as it deems reasonable and appropriate resulting in the lowest evaluated cost to the Employer. If the Bidder does not accept the Employer's decision based on any of the above, the bid shall be rejected.
- 14.8 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 28 days prior to the deadline for submission of Bids, shall be included in the rates and prices² and the total Bid price submitted by the Bidder.

15. Currencies of Bid and Payment

- 15.1 The currency (ies) of the Bid and the currency(ies) of payments shall be as **specified in the BDS**.
- 15.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency requirements, and to substantiate that the amounts included in the unit rates and prices and shown in the Schedule of Adjustment Data are reasonable³, in which case a detailed breakdown of the foreign currency requirements shall be provided by Bidders.

16. Documents Comprising the Technical Bid

- 16.1 The Bidder shall furnish details of technical specifications proposed in the Technical Bid including any documentary evidence and a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section IV, Bidding Forms, or elsewhere in the bidding document, and if applicable, a statement of deviations and exceptions to any of the provisions of the bidding document, in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the Employer's work's requirements and the completion time, and to demonstrate substantial responsiveness to the technical specifications required as per the provisions of the Section VII, Work's Requirements.

17. Documents Establishing the Eligibility and Qualifications of the Bidder

- 17.1 To establish Bidder's eligibility in accordance with ITB 4, Bidders shall complete the Letter of Bid, included in Section IV, Bidding Forms.

² In lump sum contracts, delete "rates and prices and the."

³ For lump sum contracts, delete "unit rates and prices and shown in the Schedule of Adjustment Data are reasonable" and replace with "Lump Sum."

- 17.2 In accordance with Section III, Evaluation and Qualification Criteria, to establish its qualifications to perform the Contract, the Bidder shall provide the information requested in the corresponding forms included in Section IV, Bidding Forms.
- 17.3 If a margin of preference applies as specified in accordance with ITB 33.1, domestic Bidders, individually or in joint ventures, applying for eligibility for domestic preference or regional preference shall supply all information required to satisfy the criteria for eligibility specified in accordance with ITB 33.1.

18. Period of Validity of Bids

- 18.1 Bids shall remain valid for the Bid Validity period **specified in the BDS** or any extended period if amended by the Employer in accordance with ITB 8. The Bid Validity period starts from the date fixed for the Bid submission deadline (as prescribed by the Employer in accordance with ITB 22.1). A Bid valid for a shorter period shall be rejected by the Employer as nonresponsive.
- 18.2 In exceptional circumstances, prior to the expiration of the Bid validity period, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a Bid Security is requested in accordance with ITB 19, it shall also be extended for twenty-eight (28) days beyond the deadline of the extended validity period. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request shall not be required or permitted to modify its Bid, except as provided in ITB 18.3.
- 18.3 If the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial Bid validity period, the Contract price shall be determined as follows:
- (a) in the case of **fixed price** contracts, the Contract price shall be the Bid price adjusted by the factor **specified in the BDS** to reflect any increase in the cost of inputs over the period of extension, which for the purpose of this adjustment, shall be the period elapsed between the date arrived immediately after the expiry of fifty-six (56) days beyond the initial Bid validity period and the date of notification of award;
 - (b) in the case of **adjustable** price contracts, no adjustment shall be made; and
 - (c) in any case, Bid evaluation shall be based on the Bid price without taking into consideration the applicable correction from those indicated above.

19. Bid Security

- 19.1 The Bidder shall furnish as part of its Bid, either a Bid-Securing Declaration or a Bid Security amount as **specified in the BDS**, in original form and, in the case of a Bid Security amount, in the amount and currency **specified in the BDS**.
- 19.2 A Bid Securing Declaration shall use the form included in Section IV, Bidding Forms.
- 19.3 If a Bid Security amount is specified pursuant to ITB 19.1, the Bid Security shall be a demand guarantee in any of the following forms at the Bidder's option:
- (a) an unconditional guarantee issued by a bank or non-bank financial institution (such as an insurance, bonding or surety company);

- (b) an irrevocable letter of credit;
- (c) a cashier's or certified check; or
- (d) another security **specified in the BDS**,

from a reputable source from an eligible country. If an unconditional guarantee is issued by a non-bank financial institution located outside the Employer's Country, the issuing non-bank financial institution shall have a correspondent financial institution located in the Employer's Country to make it enforceable, unless the Employer has agreed in writing, prior to Bid submission, that a correspondent financial institution is not required. In the case of a bank guarantee, the Bid Security shall be submitted either using the Bid Security Form included in Section IV, Bidding Forms, or in another substantially similar format approved by the Employer prior to Bid submission. The Bid Security shall be valid for twenty-eight (28) days beyond the original validity period of the Bid, or beyond any period of extension if requested under ITB 18.2.

- 19.4 If a Bid Security amount or Bid Securing Declaration is specified pursuant to ITB 19.1, any Bid not accompanied by a substantially responsive Bid Security or Bid-Securing Declaration whichever is required shall be rejected by the Employer as non-responsive.
- 19.5 If a Bid Security is specified pursuant to ITB 19.1, the Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's signing the Contract and furnishing the Performance Security and if required in the BDS, the Environmental and Social (ES) Performance Security pursuant to ITB 48.
- 19.6 The Bid Security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required Performance Security and if required in the BDS, the Environmental and Social (ES) Performance Security.
- 19.7 The Bid Security amount may be forfeited:
 - (a) if a Bidder withdraws its Bid during the period of Bid validity specified by the Bidder on the Letter of Bid, or any extension thereto provided by the Bidder; or
 - (b) if the successful Bidder fails to:
 - (i) sign the Contract in accordance with ITB 47; or
 - (ii) furnish a Performance Security and if required in the BDS, the Environmental and Social (ES) Performance Security in accordance with ITB 48.
- 19.8 The Bid Security amount or the Bid-Securing Declaration of a JV shall be in the name of the JV that submits the Bid. If the JV has not been constituted into a legally enforceable JV, at the time of Bidding, the Bid Security amount or the Bid-Securing Declaration shall be in the names of all future members as named in the letter of intent mentioned in ITB 4.1 and ITB 11.2.
- 19.9 If a Bid Securing declaration is required **in the BDS**, pursuant to ITB 19.1, and;

- (a) if a Bidder withdraws its Bid during the period of the Bid validity specified by the Bidder in the Letter of Bid; or any extension thereto provided by the Bidder; or
- (b) if the successful Bidder fails to: sign the Contract in accordance with ITB 47, or furnish a Performance Security and if required in the BDS, the Environmental and Social (ES), Performance Security in accordance with ITB 48.

the Borrower may execute the Bid-Securing Declaration, and as provided for **in the BDS**, declare the Bidder ineligible to be awarded a contract by the Employer for a period of time **stated in the BDS**.

20. Format and Signing of Bid

- 20.1 The Bidder shall prepare one original of the documents comprising the Bid as described in ITB 11 and clearly mark it “ORIGINAL”. Alternative Bids, if permitted in accordance with ITB 13, shall be clearly marked “ALTERNATIVE”. In addition, the Bidder shall submit copies of the Bid in the number **specified in the BDS**, and clearly mark each of them “COPY.” In the event of any discrepancy between the original and the copies, the original shall prevail.
- 20.2 Bidders shall mark as “CONFIDENTIAL” information in their Bids which is confidential to their business. This may include proprietary information, trade secrets, or commercial or financially sensitive information.
- 20.3 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as **specified in the BDS** and shall be attached to the Bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid where entries or amendments have been made shall be signed or initialed by the person signing the Bid.
- 20.4 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.
- 20.5 Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

D. Submission and Opening of Bids

21. Sealing and Marking of Bids

- 21.1 The Bidder shall deliver the Bid in a single, sealed envelope (one-envelope Bidding process). Within the single envelope the Bidder shall place the following separate, sealed envelopes:

- (a) in an envelope marked “ORIGINAL”, all documents comprising the Bid, as described in ITB 11; and
- (b) in an envelope marked “COPIES”, all required copies of the Bid; and
- (c) if alternative Bids are permitted in accordance with ITB 13, and if relevant:
 - (i) in an envelope marked “ORIGINAL - ALTERNATIVE BID”, the alternative Bid; and
 - (ii) in the enveloped marked “COPIES – ALTERNATIVE BID” all required copies of the alternative Bid.

21.2 The inner and outer envelopes shall:

- (a) bear the name and address of the Bidder;
- (b) be addressed to the Employer in accordance with ITB 22.1;
- (c) bear the specific identification of this Bidding process specified in accordance with BDS 1.1; and
- (d) bear a warning not to open before the time and date for Bid opening.

21.3 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

22. Deadline for Submission of Bids

22.1 Bids must be received by the Employer at the address and no later than the date and time **specified in the BDS**. When so **specified in the BDS**, Bidders shall have the option of submitting their Bids electronically. Bidders submitting Bids electronically shall follow the electronic bid submission procedures **specified in the BDS**.

22.2 The Employer may, at its discretion, extend the deadline for the submission of Bids by amending the bidding document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

23. Late Bids

23.1 The Employer shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 22. Any Bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.

24. Withdrawal, Substitution, and Modification of Bids

24.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 20.3, (except that withdrawal notices do not require copies). The corresponding substitution or

modification of the Bid must accompany the respective written notice. All notices must be:

- (a) prepared and submitted in accordance with ITB 20 and ITB 21 (except that withdrawal notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” “MODIFICATION”; and
- (b) received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 22.

24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders.

24.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiration of the period of Bid validity specified by the Bidder on the Letter of Bid or any extension thereof.

25. Bid Opening

25.1 Except in the cases specified in ITB 23 and ITB 24.2, the Employer shall publicly open and read out in accordance with this ITB, all Bids received by the deadline, at the date, time and place **specified in the BDS**, in the presence of Bidders’ designated representatives and anyone who chooses to attend. All Bidders, or their representatives and any interested party may attend a public opening. Any specific electronic Bid opening procedures required if electronic bidding is permitted in accordance with ITB 22.1, shall be as specified **in the BDS**.

25.2 First, envelopes marked “WITHDRAWAL” shall be opened and read out and the envelope with the corresponding Bid shall not be opened but returned to the Bidder. No Bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at Bid opening.

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

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

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

25.6 Only Bids, alternative Bids and discounts that are opened and read out at Bid opening shall be considered further for evaluation. The Letter of Bid and the priced Schedules

are to be initialed by representatives of the Employer attending Bid opening in the manner **specified in the BDS**.

- 25.7 The Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with ITB 23.1).
- 25.8 The Employer shall prepare a record of the Bid opening that shall include, as a minimum:
- (a) the name of the Bidder and whether there is a withdrawal, substitution, or modification;
 - (b) the Bid Price, per lot (contract) if applicable, including any discounts;
 - (c) the presence or absence of a Bid Security or Bid-Securing Declaration, if one was required; and
 - (d) any alternative Bids.
- 25.9 The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

E. Evaluation and Comparison of Bids

26. Confidentiality

- 26.1 Information relating to the evaluation of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with the Bidding process until information on Intention to Award the Contract is transmitted to all Bidders in accordance with ITB 43.
- 26.2 Any effort by a Bidder to influence the Employer in the evaluation of the Bids or Contract award decisions may result in the rejection of its Bid.
- 26.3 Notwithstanding ITB 26.2, from the time of Bid opening to the time of Contract award, if a Bidder wishes to contact the Employer on any matter related to the Bidding process, it shall do so in writing.

27. Preliminary Examination & Clarification of Bids

- 27.1 Prior to the detailed evaluation, pursuant to ITB 35, the Employer will conduct preliminary examination of all bids that have been received by the deadline for bid submission and opened at public bid opening as the first step towards determination of their substantial responsiveness to the bidding document. The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB 11 without recourse to extrinsic evidence. The Employer will verify and examine bids to determine whether they are complete, properly signed to bind the bidder, meet eligibility requirements of bidders, materials, equipment, and services, bidders have no conflict of interest and have provided required bid validity, bid security or bid securing declaration, as required and other essential documents to complete the evaluation, and whether the bids are generally in order. Subject to ITB

27.2 and 27.3, Bids failing to meet the above requirements shall be rejected and not retained for further review.

- 27.2 To assist in the examination, evaluation, and comparison of the Bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid given a reasonable time for a response. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change, including any voluntary increase or decrease in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids, in accordance with ITB 31.
- 27.3 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its Bid may be rejected.

28. Deviations, Reservations, and Omissions

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

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

29. Determination of Responsiveness

- 29.1 Following rejection of Bids if any, pursuant to ITB 27, as the next step, the remaining Bids will be further reviewed to determine their substantial responsiveness. The Employer's determination of a Bid's responsiveness is to be based on the contents of the Bid itself, as defined in ITB 11.
- 29.2 A substantially responsive Bid is one that meets the requirements of the bidding document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:
- (a) if accepted, would:
 - (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
 - (ii) limit in any substantial way, inconsistent with the bidding document, the Employer's rights or the Bidder's obligations under the proposed Contract; or

- (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.
- 29.3 The Employer shall examine the technical aspects of the Bid in accordance with ITB 16, ITB 17, ITB 29, ITB 30, the BDS if applicable, and Section III Evaluation and Qualification Criteria in particular, to confirm that all requirements of Section VII, Works' Requirements have been met without any material deviation, reservation or omission. To this end, in consideration of materiality of any deviations, reservations or omissions, Bids failing to meet the mandatory technical requirements or minimum pass-fail technical criteria or failing to substantially meet any other technical requirements of the bidding document will be rejected.
- 29.4 The Employer shall similarly examine the commercial aspects of the bids including any deviations, other than technical specifications, submitted in response to the provisions of the bidding document, to determine if they conform to the terms and conditions of the draft contract and other documents included in the bidding document without any material deviation, reservation or omission, and establishment of materiality in such aspects will similarly risk rejection of the Bids.
- 29.5 If a Bid is not substantially responsive to the requirements of the bidding document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission. All other bids determined substantially responsive will be retained for further evaluation.

30. Nonmaterial Nonconformities

- 30.1 Provided that a Bid is substantially responsive, the Employer may waive any nonconformities in the Bid.
- 30.2 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 30.3 Provided that a Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or nonconforming item or component, and costs associated, if any, with non-material deviations, reservations and omissions to the requirements of the bidding documents in the manner **specified in the BDS**.

31. Correction of Arithmetical Errors

- 31.1 Provided that the Bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis:
- (a) only for admeasurement contracts, if there is a discrepancy between the unit price 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 Employer there is an obvious misplacement of the decimal

point in the unit price, in which case 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) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

31.2 Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction in accordance with ITB 31.1, shall result in the rejection of the Bid.

32. Conversion to Single Currency

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

33. Margin of Preference

33.1 Unless otherwise **specified in the BDS**, no margin of domestic or regional preference shall apply. If a margin of preference applies, the application methodology shall be as specified in Section III, Evaluation and Qualification Criteria, and in accordance with the provisions stipulated in the Bank's Procurement Framework⁴.

34. Subcontractors

34.1 Unless otherwise stated **in the BDS**, the Employer does not intend to execute any specific elements of the Works by subcontractors selected in advance by the Employer, Financial Parts

34.2 The subcontractor's qualifications shall not be used by the Bidder to qualify for the Works unless their specialized parts of the Works were previously designated by the Employer **in the BDS** as can be met by subcontractors referred to hereafter as 'Specialized Subcontractors', in which case, the qualifications with respect to only the specific work experience of the Specialized Subcontractors proposed by the Bidder may be added to the qualifications.

34.3 Bidders may propose subcontracting up to the percentage of total value of contracts or the volume of works as **specified in the BDS**. Subcontractors proposed by the Bidder shall be fully qualified for their parts of the Works.

⁴ An individual firm is considered a domestic bidder for purposes of the margin of preference if it is registered in the country of the Employer, has more than 50 percent ownership by nationals of the country of the Employer, and if it does not subcontract more than 10 percent of the contract price, excluding provisional sums, to foreign contractors. JVs are considered as domestic bidders and eligible for domestic preference only if the individual member firms are registered in the country of the Employer or have more than 50 percent ownership by nationals of the country of the Employer, and the JV shall be registered in the country of the Borrower. The JV shall not subcontract more than 10 percent of the contract price, excluding provisional sums, to foreign firms. JVs between foreign and national firms will not be eligible for domestic preference.

35. Evaluation of Bids

- 35.1 The Employer shall use the criteria and methodologies listed in this ITB and Section III, Evaluation and Qualification criteria. No other evaluation criteria or methodologies shall be permitted. By applying the criteria and methodologies the Employer shall determine the successful Bid or Bids in accordance with ITB 40.
- 35.2 To evaluate Bids, the Employer shall consider the following factors, in accordance with evaluation and award criteria as applicable for single contract (one lot),⁵ lots (contracts) or packages (combination of lots) and as specified under Section III- Evaluation and Qualification Criteria:
- (a) the Bid price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities⁵ for admeasurement contracts, but including Daywork⁶ items, where priced competitively;
 - (b) price adjustment for correction of arithmetic errors in accordance with ITB 31.1;
 - (c) price adjustment due to discounts offered in accordance with ITB 12.1, ITB 14.4, ITB 14.6 and ITB 14.7;
 - (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 32;
 - (e) price adjustment for nonconformities in accordance with ITB 30.3;
 - (f) the additional evaluation factors are specified in the BDS and Section III, Evaluation and Qualification Criteria; and
 - (g) price adjustment due to application of Margin of Preference, if applicable, as per BDS of ITB 33.1, and Section III, Evaluation and Qualification Criteria.
- 35.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.
- 35.4 If this bidding document allows Bidders to quote separate prices for different lots (contracts), the methodology to determine the lowest evaluated cost of the contract combinations, including any discounts offered in the Letter of Bid, is specified in Section III, Evaluation and Qualification Criteria.

36. Comparison of Bids

⁵ In lump sum contracts, delete "Bill of Quantities" and replace with "Activity Schedule."

⁶ Daywork is work carried out following instructions of the Project Manager and paid for on the basis of time spent by workers, and the use of materials and the Contractor's equipment, at the rates quoted in the Bid. For Daywork to be priced competitively for Bid evaluation purposes, the Employer must list tentative quantities for individual items to be costed against Daywork (e.g., a specific number of tractor driver staff-days, or a specific tonnage of Portland cement), to be multiplied by the Bidders' quoted rates and included in the total Bid price.

- 36.1 The Employer shall compare the evaluated costs of all substantially responsive Bids established in accordance with ITB 35.2 to determine the Bid that has the lowest evaluated cost.

37. Abnormally Low Bids

- 37.1 An Abnormally Low Bid is one where the Bid price, in combination with other constituent elements of the Bid, appears unreasonably low to the extent that the Bid price raises material concerns as to the capability of the Bidder to perform the Contract for the offered Bid price.
- 37.2 In the event of identification of a potentially Abnormally Low Bid, the Employer shall seek written clarifications from the Bidder, including detailed price analyses of its Bid price in relation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the bidding document.
- 37.3 After evaluation of the price analyses, in the event that the Employer determines that the Bidder has failed to demonstrate its capability to perform the Contract for the offered Bid Price, the Employer shall reject the Bid.

38. Unbalanced or Front-Loaded Bids

- 38.1 If the Bid for an admeasurement contract, which results in the lowest evaluated cost is, in the Employer's opinion, seriously unbalanced or, front loaded, the Employer may require the Bidder to provide written clarifications. Clarifications may include detailed price analyses to demonstrate the consistency of the Bid price as with the scope of works, proposed methodology, schedule and any other requirements of the bidding document.
- 38.2 After the evaluation of the information and detailed price analyses presented by the Bidder, the Employer may as appropriate:
- (a) accept the Bid; or
 - (b) require that the amount of the Performance Security be increased at the expense of the Bidder to a level not exceeding 20% of the Contract Price; or
 - (c) reject the Bid.

39. Qualification of the Bidder

- 39.1 The Employer shall determine to its satisfaction whether the eligible Bidder or Bidders that is/are selected as having submitted the lowest evaluated cost and substantially responsive Bid (s) substantially meet the respective minimum qualifying criteria specified in Section III, Evaluation and Qualification Criteria. To this end, the Employer will determine for which Lots and Packages, and/or their combinations, as the case may be, for which Bidder submitted bid, it substantially meets the respective minimum qualification criteria.
- 39.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17. The determination shall not take into consideration the qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates, subcontractors (other than

Specialized Subcontractors if permitted in the bidding document), or any other firm(s) different from the Bidder.

- 39.3 An affirmative determination of qualification shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the Bid, in which event the Employer shall proceed to the Bidder or Bidders who offered substantially responsive Bid (s) with the next lowest evaluated cost to make a similar determination of such Bidders' qualifications to perform satisfactorily.
- 39.4 The Employer reserves the right to waive minor deviations from the qualification criteria if they do not materially affect the technical capability and financial resources of the Bidder to perform the Contract or combination of Contracts.

40. Successful Bid or Bids

- 40.1 Having compared the evaluated costs of Bids, the Employer shall determine the successful Bid or combination of Bids as the case may be, in accordance with the additional Bid Evaluation Criteria as further described in Section III Such Bid or Bids would be those which has/have been determined to:
- (a) be substantially responsive to the bidding document;
 - (b) offer the lowest evaluated cost to the Employer for all works to be procured based on either a single Contract or all multiple Contracts combined, as the case may be, in accordance with the ITB 14.6 inviting bid prices and discounts, and provisions made in the Bidding Document for evaluation of bids and award of contract (s); and
 - (c) be offered by Bidder or Bidders that substantially meet the qualification criteria applicable for Contract or combination of Contracts for which they are selected.

41. Employer's Right to Accept Any Bid, and to Reject Any or All Bids

- 41.1 The Employer reserves the right to accept or reject any Bid, and to annul the Bidding process and reject all Bids at any time prior to Contract Award, without thereby incurring any liability to Bidders. In case of annulment, all Bids submitted and specifically, Bid securities, shall be promptly returned to the Bidders.

42. Standstill Period

- 42.1 The Contract shall not be awarded earlier than the expiry of the Standstill Period. The Standstill Period shall be ten (10) Business Days unless extended in accordance with ITB 46. The Standstill Period commences the day after the date the Employer has transmitted to each Bidder the Notification of Intention to Award the Contract. Where only one Bid is submitted, or if this contract is in response to an emergency situation recognized by the Bank, the Standstill Period shall not apply.

43. Notification of Intention to Award

- 43.1 The Employer shall send to each Bidder the Notification of Intention to Award the Contract to the successful Bidder. The Notification of Intention to Award shall contain, at a minimum, the following information:
- (a) the name and address of the Bidder submitting the successful Bid;

- (b) the Contract price of the successful Bid;
- (c) the names of all Bidders who submitted Bids, and their Bid prices as readout, and as evaluated;
- (d) a statement of the reason(s) the Bid (of the unsuccessful Bidder to whom the notification is addressed) was unsuccessful, unless the price information in c) above already reveals the reason;
- (e) the expiry date of the Standstill Period; and
- (f) instructions on how to request a debriefing and/or submit a complaint during the standstill period.

F. Award of Contract

44. Award Criteria

- 44.1 Subject to ITB 41, and unless otherwise specified in the BDS, the Employer shall award the Contract or Contracts to the Bidder or Bidders whose Bid or Bids has/have been determined successful in accordance with ITB 40.

45. Notification of Award

- 45.1 Prior to the expiration of the Bid Validity Period and upon expiry of the Standstill Period, specified in ITB 42.1 or any extension thereof, and, upon satisfactorily addressing any complaint that has been filed within the Standstill Period, the Employer shall notify the successful Bidder, in writing, that its Bid has been accepted. The notification of award (hereinafter and in the Conditions of Contract and Contract Forms called the “Letter of Acceptance”) shall specify the sum that the Employer will pay the Contractor in consideration of the execution of the contract (hereinafter and in the Conditions of Contract and Contract Forms called “the Contract Price”).
- 45.2 Within ten (10) Business Days after the date of transmission of the Letter of Acceptance, the Employer shall publish the Contract Award Notice which shall contain, at a minimum, the following information:
- (a) name and address of the Employer;
 - (b) name and reference number of the contract being awarded, and the selection method used;
 - (c) names of all Bidders that submitted Bids, and their Bid prices as read out at Bid opening, and as evaluated;
 - (d) names of all Bidders whose Bids were rejected either as nonresponsive or as not meeting qualification criteria, or were not evaluated, with the reasons therefor;
 - (e) the name of the successful Bidder, the final total contract price, the contract duration and a summary of its scope; and
 - (f) successful Bidder’s Beneficial Ownership Disclosure Form, if specified in BDS ITB 47.1.

- 45.3 The Contract Award Notice shall be published on the Employer's website with free access if available, or in at least one newspaper of national circulation in the Employer's Country, or in the official gazette. The Employer shall also publish the contract award notice in UNDB online.
- 45.4 Until a formal contract is prepared and executed, the Letter of Acceptance shall constitute a binding Contract.

46. Debriefing by the Employer

- 46.1 On receipt of the Employer's Notification of Intention to Award referred to in ITB 43.1, an unsuccessful Bidder has three (3) Business Days to make a written request to the Employer for a debriefing. The Employer shall provide a debriefing to all unsuccessful Bidders whose request is received within this deadline.
- 46.2 Where a request for debriefing is received within the deadline, the Employer shall provide a debriefing within five (5) Business Days, unless the Employer decides, for justifiable reasons, to provide the debriefing outside this timeframe. In that case, the standstill period shall automatically be extended until five (5) Business Days after such debriefing is provided. If more than one debriefing is so delayed, the standstill period shall not end earlier than five (5) Business Days after the last debriefing takes place. The Employer shall promptly inform, by the quickest means available, all Bidders of the extended standstill period
- 46.3 Where a request for debriefing is received by the Employer later than the three (3) Business Day deadline, the Employer should provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of Public Notice of Award of contract. Requests for debriefing received outside the three (3) day deadline shall not lead to extension of the standstill period.
- 46.4 Debriefings of unsuccessful Bidders may be done in writing or verbally. The Bidder shall bear their own costs of attending such a debriefing meeting.

47. Signing of Contract

- 47.1 The Employer shall send to the successful Bidder the Letter of Acceptance including the Contract Agreement, and, if specified in the BDS, a request to submit the Beneficial Ownership Disclosure Form providing additional information on its beneficial ownership. The Beneficial Ownership Disclosure Form, if so requested, shall be submitted within eight (8) Business Days of receiving this request.
- 47.2 The successful Bidder shall sign, date and return to the Employer, the Contract Agreement within twenty-eight (28) days of its receipt.

48. Performance Security

- 48.1 Within twenty-eight (28) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish the Performance Security and, if required in the BDS, the Environmental and Social (ES) Performance Security in accordance with the General Conditions of Contract, subject to ITB 38.2 (b), using for that purpose the Performance Security and ES Performance Security Forms included in Section X, Contract Forms, or another form acceptable to the Employer. If the Performance Security furnished by the successful Bidder is in the form of a

bond, it shall be issued by a bonding or insurance company that has been determined by the successful Bidder to be acceptable to the Employer. A foreign institution providing a bond shall have a correspondent financial institution located in the Employer's Country, unless the Employer has agreed in writing that a correspondent financial institution is not required.

- 48.2 Failure of the successful Bidder to submit the above-mentioned Performance Security and, if required in the BDS, the Environmental and Social (ES) Performance Security, or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Employer may award the Contract to the Bidder or Bidders offering the next Lowest Evaluated Cost to the Employer as per the bid evaluation and award criteria.

49. Adjudicator

- 49.1 The Employer proposes the person named **in the BDS** to be appointed as Adjudicator under the Contract, at the hourly fee **specified in the BDS**, plus reimbursable expenses. If the Bidder disagrees with this proposal, the Bidder should so state in his Bid. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority designated in the Particular Conditions of Contract (PCC) pursuant to Clause 23.1 of the General Conditions of Contract (GCC), to appoint the Adjudicator.

50. Procurement Related Complaint

- 50.1 The procedures for making a Procurement-related Complaint are as **specified** in the BDS.

Section II - Bid Data Sheet (BDS)

The following specific data for the Works to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

ITB Reference	A. General
ITB 1.1	<p>The reference number of the Invitation for Bids (IFB) is: AWWDA/NARSIP II/W-05/2022.</p> <p>The Employer is: ATHI WATER WORKS DEVELOPMENT AGENCY</p> <p>Name of Works: LOT 5-CONSTRUCTION OF NAIROBI INFORMAL SETTLEMENTS WATER AND SANITATION INTENSIFICATION WORKS.</p> <p>The name of the IFB is: <i>NATIONAL COMPETITIVE BIDDING (NCB)</i></p> <p>The number and identification of works under single contracts comprising this IFB is: AWWDA/NARSIP II/W-05/2022.</p>
ITB 2.1	<p>The Borrower is: <i>Government of Kenya</i></p> <p>The Specific Bank financing institution is: AfDB</p> <p>The name of the Project is: Nairobi Rivers Basin Rehabilitation and Restoration Program: Sewerage Improvement Project- Phase 2. (NaRSIP 2)</p>
ITB 4.1 (a)	<p>i) The firms in a Joint Venture, Consortium or Association (JV) shall be jointly and severally liable.</p>
ITB 4.5	<p>A list of debarred firms and individuals is available on the Bank's external website: https://www.afdb.org/en/projects-operations/debarment-and-sanctions-procedures</p>
B. Contents of Bidding Document	

ITB 7.1	<p>For <u>Clarification of Bid purposes</u> only, the Employer's address is:</p> <p>Attention: Chief Executive Officer.</p> <p>Athi Water Works Development Agency Athi Water Plaza, Muthaiga North Rd, Off Kiambu Road, P. O Box: 45283-00100 NAIROBI, KENYA Fax: +254-20-2724295 Email: info@awwda.go.ke Telephone: +254 2724292/3</p>
ITB 7.1	Requests for clarification should be received by the Employer no later than: <i>14 days to the bid submission date i.e 12th April 2022</i>
ITB 7.1	Web page: http://www.awwda.go.ke
ITB 7.4	A Prebid meeting and Site Visit shall take place on 29th March, 2022 starting at 09:00am (East African Time). The venue for the Pre-Bid site visit meeting will be at the Athi Water Works Development Agency Offices, Athi Water Plaza, Muthaiga North Road, Off Kiambu road, Nairobi.
C. Preparation of Bids	
ITB 10.1	The language of the Bid is: English.
ITB 11.1 (b)	Bidder shall complete: Bill of Quantities and all Activity Schedules
ITB 11.1 (k)	The Bidder shall submit the following additional documents in its Bid: As per section IV.
ITB 13.1	Alternative Bids <i>shall not be</i> permitted.
ITB 13.2	Alternative times for completion <i>shall not be</i> permitted.
ITB 13.4	Alternative technical solutions <i>shall not be</i> permitted.
ITB 14.2	The prices <i>shall be</i> fixed.
ITB 14.5	The prices quoted by the Bidder <i>shall not be</i> subject to adjustment during the performance of the Contract.
ITB 15.1	The price shall be quoted by the Bidder in: <i>the local currency (Kenya Shillings)</i>
ITB 18.1	The Bid validity period shall be <i>120</i> days.
ITB 19.1	The Bidder shall furnish a bid security in the amount of KES 1,000,000.00 (Kenya Shillings One million) in form of an unconditional Bank Guarantee.
ITB 20.1	In addition to the original of the Bid, the number of copies is: <i>Three Copies.</i>

ITB 20.3	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: <i>Power of Attorney.</i>
D. Submission and Opening of Bids	
ITB 22.1	<p>For <u>Bid submission purposes</u> only, the Employer's address is:</p> <p>Attention: Chief Executive Officer Address: Athi Water Works Development Agency Building: Athi Water Plaza, Street: Muthaiga North Rd, Off Kiambu Road, P. O Box: 45283-00100 City: NAIROBI, Country: KENYA Fax: +254-20-2724295</p> <p>The deadline for Bid submission is: Date: 26th April, 2022 Time: 12: 00 Noon (East African Time) Bidders shall not have the option of submitting their Bids electronically.</p>
ITB 25.1	<p>The Bid opening shall take place at Athi Water Works Development Agency Offices located at: -</p> <p>Building: Athi Water Plaza, Street: Muthaiga North Rd, Off Kiambu Road, City: Nairobi, Country: Kenya.</p> <p>Date: 26th April, 2022 Time: 12:05PM (East African Time)</p>
ITB 25.6	The Letter of Bid and Schedules shall be initialed by representatives of the Employer conducting Bid opening.
E. Evaluation and Comparison of Bids	
ITB 30.3	The adjustment with respect to a missing or non-conforming item or component, and costs associated, if any, with non-material deviations, reservations or omissions to the requirements of the bidding document shall be based on the average price of the item or component and cost, if any, of non-material deviations, reservations or omissions as quoted in or derived from other substantially responsive Bids unless any other specific evaluation criteria has been provided elsewhere in the bidding document for such adjustments in which case the latter shall be applied. If the price or cost of any of the above cannot be derived from the price of other substantially responsive

	Bids, the Employer shall use its best estimate based on its own judgment, past experience or market search, as considered appropriate.
ITB 32.1	<p>The currency that shall be used for Bid evaluation and comparison purposes to convert at the selling exchange rate all Bid prices expressed in various currencies into a single currency is: <i>Kenya Shillings</i></p> <p>The source of exchange rate shall be: <i>Central Bank of Kenya in the Employer's Country).</i></p> <p>The date for the exchange rate shall be: <i>26th April 2022 (the date of bid submission)</i></p>
ITB 33.1	<p>A margin of domestic preference <i>"shall not"</i> apply.</p> <p>A margin of regional preference <i>"shall not"</i> apply</p>
F. Award of Contract	
ITB 47.1	The successful Bidder <i>shall not</i> submit the Beneficial Ownership Disclosure Form.
ITB 49	<p>The Adjudicator proposed by the Employer is: Chartered Institute of Arbitrators Kenya Chapter. The hourly fee for this proposed Adjudicator shall be: Kshs. 20,000.00. The biographical data of the proposed Adjudicator is _____ as follows _____ (:To _____ be _____ identified)</p>
ITB 50.1	<p>The procedures for making a Procurement-related Complaint are detailed in the Part B of the Operations Procurement Manual under the Procurement Framework of the African Development Bank. If a Bidder wishes to make a Procurement-related Complaint, the Bidder shall submit its complaint following these procedures to the employer, in writing (by the quickest means available, such as by email in accordance with the following:</p> <p>For the attention: Eng. Michael M. Thuita Title/position: Chief Executive Officer Employer: Athi Water Works Development Agency Email address: info@awwda.go.ke</p> <p>In summary, a Procurement-related Complaint may challenge any of the following:</p> <ol style="list-style-type: none"> 1. the terms of the Bidding Documents; 2. the purchaser's decision to exclude a bidder from the procurement process prior to the award of contract; and 3. the Employer's decision to award the contract. <p>The Bank's Procurement Framework stipulates that bidders may send copies of their communications with the Borrowers to the Bank or write to the Bank</p>

	<p>directly when, Borrowers do not respond promptly, any questions on any issues regarding the implementation of Bank funded projects, or when the communication is a complaint against the Borrower. In this regard, if a bidder wishes to protest against a decision made by a Borrower or the Bank with regards to the procurement process or wishes to inform the Bank that the Bank's procurement rules and/or provisions of the bidding documents have not been complied with, an email can be sent to the following address:</p> <p>Email: procurementcomplaints@afdb.org</p>
--	---

Section III - Evaluation and Qualification Criteria

This section contains all the criteria that the Employer shall use to evaluate Bids and qualify Bidders through post-qualification. No other factors, methods or criteria shall be used other than specified in this bidding document. The Bidder shall provide all the information requested in the forms included in Section IV, Bidding Forms.

Table of Criteria

1.	Margin of Preference	43
2.	Successful Bid or Bids and Evaluation.....	43
3.	Qualification	45
4.	Key Personnel.....	51
5.	Equipment.....	52

1. Margin of Preference

1.1 Preference for Domestic Contractors: N/A

1.2 Preference for Regional Contractors: N/A

2. Successful Bid or Bids

In continuation and accordance with ITB 40, the Employer shall use the criteria and methodologies listed in this Section to evaluate Bids. By applying these criteria and methodologies, the Employer shall determine the successful Bid or Bids which has/have been determined to:

- (a) be substantially responsive to the bidding document;
- (b) offer the lowest evaluated cost to the Employer for all works to be procured in accordance with the ITB 14.6 inviting bid prices and discounts, and provisions made of the Bidding Document for evaluation of bids and award of contract (s); and
- (c) be offered by Bidder or Bidders that substantially meet the qualification criteria applicable for Contract or combined Contracts for which they are selected.

2.1 Evaluation

In addition to the criteria listed in ITB 35.2 (a) – (e) the following criteria shall apply:

2.1.1 Adequacy of Technical Proposal (Reference ITB 16 and ITB 29.3): The Employer will determine whether Technical Proposal will include an assessment of the Bidder's technical capacity to the Bids are substantially responsive to the Technical Requirements. Evaluation of the Bidder's mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section VII, Works' Requirements.

2.1.2 Evaluation of Commercial Terms and Conditions of the Bid (Reference ITB 29.4): The Employer will determine whether the Bids are substantially responsive to the Commercial and Contractual Terms and Conditions.

(a) Evaluation and Award Criteria for Single and Multiple Contracts [ITB 35.4]:

(i) 'Works'

Evaluation and Award Criteria for 'Works' as One (Single) Contract: The bids will be evaluated for 'Works' and the contract will be awarded to the Bidder offering the lowest evaluated cost to the Employer for 'Works' subject to the selected Bidder substantially meeting the required qualification criteria for the contract, and determination of substantial responsiveness of the Bid.

2.3 Alternative Completion Times

An alternative Completion Time, if permitted under ITB 13.2,

“Alternative time for completion is not permitted.

2.5 Alternative Technical Solutions for specified parts of Works

N/A

2.6 Specialized Subcontractors

N/A

3. Qualification

Eligibility and Qualification Criteria				Compliance Requirements			Document ation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
1. Eligibility							
1.1.1	Nationality	Nationality in accordance with ITB 4.4	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.1.2	Eligibility of Materials, Equipment and Services	Country of Origin in accordance with ITB 5	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid & Form ELI-1.3
1.2	Conflict of Interest	No conflicts of interest in accordance with ITB 4.2	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.3	Bank Eligibility	Not having been declared ineligible by the Bank, as described in ITB 4.5.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.4	State-owned enterprise or institution of the Borrower country	Meets conditions of ITB 4.6	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.5	United Nations resolution or Borrower’s country law	Not having been excluded as a result of prohibition in the Borrower’s country laws or official regulations against commercial relations with the Bidder’s country, or by an act of compliance with UN Security Council	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments

Eligibility and Qualification Criteria			Compliance Requirements				Document ation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submissio n Requireme nts
				All members Combined	Each Member	At least one Member	
		resolution, both in accordance with ITB 4.8 and Section V.					
2. Historical Contract Non-Performance							
2.1	History of Non-Performing Contracts	Non-performance of a contract ⁷ did not occur as a result of contractor default since 1 st January, 2017.	Must meet requirement ^{1 & 2}	Must meet requirements	Must meet requirement ⁸	N/A	Form CON-2
2.2	Suspension Based on Execution of Bid Securing Declaration by the Employer or withdrawal of the Bid within Bid validity period or other failures	Not under suspension based on execution of a Bid Securing Declaration pursuant to ITB 4.7 or withdrawal of the Bid or other failures pursuant ITB 19.9	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
2.3	Pending Litigation	Bidder's financial position and prospective long-term profitability sound according to criteria established in 3.1 below and assuming that all pending	Must meet requirement	N/A	Must meet requirement	N/A	Form CON – 2

⁷ Nonperformance, as decided by the Employer, shall include all contracts where (a) nonperformance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Nonperformance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Nonperformance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

⁸ This requirement also applies to contracts executed by the Bidder as JV member.

Eligibility and Qualification Criteria			Compliance Requirements				Document ation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submissio n Requireme nts
				All members Combined	Each Member	At least one Member	
		litigation will be resolved against the Bidder					
2.4	Litigation History	No consistent history of court/arbitral award decisions against the Bidder ⁹ since 1 st January 2017	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Form CON – 2
2.5	Declaration : Environmental and Social (ES) past performance	Declare any civil work contracts that have been suspended or terminated and/or performance security called by an employer for reasons related to the non-compliance of any environmental, or social (including sexual exploitation and abuse (SEA) as per contractual obligations in the past five years ¹⁰ .	Must make the declaration. Where there are Specialized Sub-contractor /s, the Specialized Sub-contractor /s must also make the declaration.	N/A	Each must make the declaration. Where there are Specialized Sub-contractor /s, the Specialized Sub-contractor /s must also make the declaration.	N/A	Form CON-3 ES Performance Declaration
3. Financial Situation and Performance							

⁹ The Bidder shall provide accurate information on the Letter of Bid about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last five years. A consistent history of court/arbitral awards against the Bidder or any member of a joint venture may result in disqualifying the Bidder.

¹⁰ The Employer may use this information to seek further information or clarifications in carrying out its due diligence.

Eligibility and Qualification Criteria			Compliance Requirements				Document ation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submissio n Requireme nts
				All members Combined	Each Member	At least one Member	
3.1	Financial Capabilities	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements estimated as Kenya Shillings One Hundred and Fifty Million (KES. 150 million) or for the subject contract(s) net of the Bidder's other commitments	Must meet requirement	Must meet Requirement	N/A	N/A	Form FIN – 3.1, 3.3 and 3.4 with attachments
		(ii) The Bidders shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract	Must meet requirement	Must meet requirement	N/A	N/A	

Eligibility and Qualification Criteria			Compliance Requirements				Document ation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
		commitments.					
		(iii) The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements acceptable to the Employer, for the last Five (5) years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.	Must meet requirement	N/A	Must meet requirement	N/A	
3.2	Average Annual Construction Turnover	Minimum average annual construction turnover of Kenya Shillings Two Hundred Million (KES. 200Million) calculated as total certified payments received for contracts in progress and/or completed within the last THREE (3) Years, divided by years	Must meet requirement	Must meet requirement	Must meet 50%, _of the requirement	Must meet 100 %, of the requirement	Form FIN – 3.2

Eligibility and Qualification Criteria			Compliance Requirements				Document ation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
4. Experience							
4.1 (a)	General Construction Experience	Experience under construction contracts in the role of prime contractor, JV member, subcontractor, or management contractor for at least the last Five (5) years, starting 1 st January, 2017	Must meet requirement	N/A	Must meet requirement	N/A	Form EXP – 4.1
4.2 (a)	Specific Construction & Contract Management Experience	(i) A minimum number of Three (3) similar contracts specified below that have been satisfactorily and substantially ¹¹ completed as a prime contractor, joint venture member ¹² , management contractor or sub-contractor ¹² between 1st January, 2017 and bid submission deadline:	Must meet requirement	Must meet requirement ¹³	N/A	Must meet the following requirements for the key activities listed below [list key activities and the corresponding minimum requirements to be met by one member otherwise state: "N/A"]	Form EXP 4.2(a)

¹¹ Substantial completion shall be based on 80% or more works completed under the contract.

¹² For contracts under which the Bidder participated as a joint venture member or sub-contractor, only the Bidder's share, by value, shall be considered to meet this requirement.

¹³ In the case of JV, the value of contracts completed by its members shall not be aggregated to determine whether the requirement of the minimum value of a single contract has been met. Instead, each contract performed by each member shall satisfy the minimum value of a single contract as required for single entity. In determining whether the JV meets the requirement of total number of contracts, only the number of contracts completed by all members each of value equal or more than the minimum value required shall be aggregated.

Eligibility and Qualification Criteria			Compliance Requirements				Document ation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submissio n Requireme nts
				All members Combined	Each Member	At least one Member	
		<p>(i)each of minimum value Kenya Shillings One Hundred and Fifty Million (KES. 150 million),</p> <p>The similarity of the contracts shall be based on relation to</p> <p>Trunk sewerage with minimum diameter of 160 mm PCC and length of 5km with a production rate of 500m per month,</p> <p>Construction of at least 5 No. ablution blocks in informal settlements</p> <p>Drilling of boreholes minimum depth 250 m deep and</p> <p>construction of at least 1No.24m³ elevated tank on an 18 m high tower.</p>					

4. Key Personnel

The Bidder must demonstrate that it will have suitably qualified (and in adequate numbers) Key Personnel that meet the following requirements:

No.	Position	Total Work Similar Experience (years)	In Similar Works Experience (years)
1	One (1) Site Agent (registered Civil Engineer or equivalent)	10	7
2	One (1) Deputy Site Agent (Civil Engineer or equivalent)	7	5
3	One (1) Contract Manager (Civil engineer or equivalent)	5	4
4	One (1) Engineer (university graduate Water Works)	5	4
5	One (1) Site Engineering surveyor	5	4
6.	One (1) Environmentalist (University Graduate in Environmental Science or equivalent) – Registered with NEMA	5	4
7.	Two (2 No.) Sociologists (University Graduate in Sociology or equivalent) – Registered with NEMA (or Equivalent)	5	4
9.	One (1) Health and Safety Officer (Degree in Engineering, Environmental or Health Sciences/ + training and certification in Occupational Health and Safety Course	7	3

The Bidder shall provide details of the Key Personnel and such other Key Personnel that the Bidder considers appropriate to perform the Contract, together with their academic qualifications and work experience. The Bidder shall complete the relevant Forms in Section IV, Bidding Forms.

5. Equipment

The Bidder must demonstrate that it will have access to the key Contractor's equipment listed hereafter:

S/NO	Equipment types and characteristics	Minimum number required
1)	1.5 m3 or 20-ton Excavator	2
2)	2m3 Concrete dumpers	1
3)	Poker vibrator 20 mm diameter	2
4)	Tipper Lorry - 7 Ton	1
5)	Tipper Lorry - 10 Ton	1
6)	Concrete Mixers 1m ³ including batch weighing	1

7)	Air compressor (5,000l/min)	2
8)	Generator (15kVA)	2
9)	Total station/Geodetic equipment	1
10)	Dewatering pumps	2
11)	Mobile rubber tyred crane (5 ton)	1
12)	Pick up	1
13)	Borehole drilling rotary rigs (to depth >200 m and nominal internal bore diameter of 160 mm)	1

The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section IV.

Section IV - Bidding Forms

Table of Forms

Letter of Bid.....	55
Schedules.....	58
Bill of Quantities.....	58
1. Sample Bill of Quantities.....	Error! Bookmark not defined.
2. Table C: Schedule of Payment Currencies	59
3. Schedule(s) of Adjustment Data	60
Forms of Bid Security	61
Form of Bid Security - Bank Guarantee	61
Form of Bid Security – Bid Bond	63
Form of Bid-Securing Declaration.....	65
Technical Bid.....	66
Technical Bid Forms.....	66
Technical Bid-Base Bid	67
Key Personnel Schedule	68
Equipment	72
Site Organization	73
Method Statement	74
Mobilization Schedule	75
Construction Schedule	76
ES Management Strategies and Implementation Plans	77
Code of Conduct for Contractor’s Personnel (ES) Form.....	78
Commercial Terms and Conditions	83
Bidder’s Qualification	84
Form ELI -1.1: Bidder Information Form.....	85
Form ELI -1.2: Information Form for JV Bidders	86
Form ELI -1.3: Eligible Materials, Equipment and Services Form	87
Form CON – 2: Historical Contract Non-Performance	88
Form CON – 3:	91
Environmental and Social Performance Declaration	91
Form CCC: Current Contract Commitments / Works in Progress	93
Form FIN – 3.1: Financial Situation and Performance	95
Form FIN - 3.2: Average Annual Construction Turnover	97
Form FIN - 3.3: Financial Resources.....	98
Financial Resources of the Reporting Firm	98
Form EXP - 4.1: General Construction Experience.....	99
Form EXP - 4.2(b): Construction Experience in Key Activities.....	104
Form EXP - 4.2(c): Specific Experience in Managing ES aspects.....	107

Letter of Bid

The Bidder must prepare this Letter of Bid on stationery with its letterhead clearly showing the Bidder's complete name and business address.

Date of this Bid submission: _____ *[insert date (as day, month and year) of Bid submission]*

OCB No.: _____ *- [insert number of bidding process as per procurement plan]*

IFB No.: _____ *[insert same IFB number as advertised]*

To:

**THE CHIEF EXECUTIVE OFFICER
ATHI WATER WORKS DEVELOPMENT AGENCY,
ATHI PLAZA, MUTHAIGA NORTH ROAD - OFF KIAMBU ROAD,
P.O. BOX 45283 -00100,
NAIROBI - KENYA.**

We, the undersigned, declare that:

- (a) **No reservations:** We have examined and have no reservations to the bidding document, including Addenda issued in accordance with ITB 8;
- (b) **Eligibility of Bidder:** We, including any subcontractors or suppliers for any part of the Contract, have nationalities from eligible countries and meet the eligibility requirements and have no conflict of interest in accordance with ITB 4;
- (c) **Eligibility of Materials, Equipment and Services:** We meet the eligibility requirements for Materials, Equipment and Services in accordance with ITB 5;
- (d) **Conformity:** We offer to execute in conformity with the bidding document the following Works: *[insert a brief description of the Works]* _____
- (e) **Bid Price:** The total price of our Bid, excluding any discounts offered in item (f) below is: *[amount of foreign currency in words], [amount in figures], and [amount of local currency in words], [amount in figures];*
- (f) **Discounts:** The discounts offered and the methodology for their application are:
 - (i) The discounts offered are: *[Specify in detail each discount offered.]*
 - (ii) The exact method of calculations to determine the net price of each item and 'Works' (one contract/lot), and in case of multiple lots or multiple packages, net price of each item, each lot and each package after application of discounts is shown below: *[Specify in detail the method that shall be used to apply the discounts and ensure clarity, unambiguity, etc. in accordance with ITB 14.7];*
- (g) **Bid Validity Period:** Our Bid shall be valid for a period of _____ specified in BDS ITB 18.1 (or as amended, if applicable) from the date fixed for the Bid submission

deadline in accordance with the bidding document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

- (h) **Performance Security:** If our Bid is accepted, we commit to obtain a performance security in accordance with the bidding document;
- (i) **One Bid Per Bidder:** We are not submitting any other Bid(s) as an individual Bidder or as a subcontractor, and we are not participating in any other Bid(s) as a Joint Venture member, and meet the requirements of ITB 4.3, other than alternative Bids submitted in accordance with ITB 13;
- (j) **Suspension and Debarment:** We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Bank or a debarment imposed by the Bank in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the Bank and other development banks. Further, we are not ineligible under the Employer's Country laws or official regulations or pursuant to a decision of the United Nations Security Council;
- (k) **State-owned enterprise or institution:** *[select the appropriate option and delete the other] [We are not a state-owned enterprise or institution] / [We are a state-owned enterprise or institution but meet the requirements of ITB 4.6];*
- (l) **Commissions, gratuities and fees:** We have paid, or will pay the following commissions, gratuities, or fees with respect to the Bidding process or execution of the Contract: *[insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]*

Name of Recipient	Address	Reason	Amount

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

- (m) **Binding Contract:** We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;
- (n) **Not Bound to Accept:** We understand that you are not bound to accept the lowest evaluated cost Bid, or any other Bid that you may receive; and
- (p) **Fraud and Corruption:** We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Fraud and Corruption; and
- (q) **Adjudicator:** We accept the appointment of *[insert name proposed in Bid Data Sheet]* as the Adjudicator.

[or]

We do not accept the appointment of *[insert name proposed in Bid Data Sheet]* as the Adjudicator, and propose instead that *[insert name]* be appointed as Adjudicator, whose daily fees and biographical data are attached.

Name of the Bidder: _____ **[insert complete name of person signing the Bid]*

Name of the person duly authorized to sign the Bid on behalf of the Bidder:

_____ ***[insert complete name of person duly authorized to sign the Bid]*

Title of the person signing the Bid: _____ *[insert complete title of the person signing the Bid]*

Signature of the person named above: _____ *[insert signature of person whose name and capacity are shown above]*

Date signed _____ *[insert date of signing]* **day of** *[insert month]*, *[insert year]*

* In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder or names of all members (partners) of JV and sign on behalf of the JV and not on behalf of only one member that has been given power of attorney.

** Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid. If the Bidder is a JV, the power of attorney shall be given by the JV or by all members of the JV.

Schedules

Bill of Quantities

**BILLS OF QUANTITIES FOR LOT 5-CONSTRUCTION WORKS FOR NAIROBI INFORMAL
SETTLEMENTS WATER AND SANITATION INTERVENTIONS.**

CONTRACT No. AWWDA/NARSIP II/W-05/2021

GRAND SUMMARY

BILL NO.	DESCRIPTION	AMOUNT (KShs)
1	Preliminaries and General Items	22,550,000.00
2A	Gatina & Kawangware Works	-
2B	Waithaka & Riruta Works	-
3A	Kayole, Soweto, Matopeni, Kamola, Vumilia, Karsan	-
3B	Mukuru kwa Njenga, Kwa Reuben, Kware, Lungalunga, Kisii Village, Hazina, Kayaba	5,000,000.00
4	Muthurwa, Gorofani, Bondeni, Majengo, Blue Estate	-
5	Lindi and Sarangombe	-
6	Kiambiu	-
7	Mathare 4A, Mathare, Mlango kubwa	-
8	Boreholes with elevated steel tanks	3,150,000.00
9	SEWER CONNECTION TYPE B	-
10	Rehabilitation of Ablution Blocks	-
11	SUMMARY SUB TOTAL 1	
12	ADD 10% CONTIGENCIES	
13	SUMMARY SUB TOTAL 2(9+10)	
14	ADD 16% VAT	
15	GRAND TOTAL (11+12)	

DAYWORKS

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
1.1	<u>LABOUR</u> The rates inserted hereafter should include all such costs as insurance, travel time, overtime expenses, accomodation, use and maintenance of small tools of trade, Contractors overheads and profit. Only time engaged upon work instructed by the Engineer under this Bill will be paid for.				
1.1.1	Unskilled labour	hr	1		
1.1.2	Foreman	hr	1		
1.1.3	Driver	hr	1		
1.1.4	Mason	hr	1		
1.1.5	Carpenter	hr	1		
1.1.6	Plumber	hr	1		
1.1.7	Electrician	hr	1		
1.1.8	Plant Operator	hr	1		
1.1.9	Supervisor	hr	1		
1.1.10	Pipelayer	hr	1		
1.1.11	Painter	hr	1		
1.1.12	Concretor	hr	1		
1.1.13	Technician	hr	1		
1.1.14	Watchman	hr	1		
PAGE TOTAL FOR LABOUR CARRIED TO SECTION COLLECTION SHEET					

DAYWORKS

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
1.2	<u>MATERIALS</u> Materials shall comply with the relevant Technical Specifications and shall be subject to the approval of the Resident Engineer. The rate to include for delivery, storage, handling, Contractor's overheads, etc.				
1.2.1	Building sand	ton	1		
1.2.2	Ordinary portland cement in 50 kg bags	No.	1		
1.2.3	Fine aggregate	ton	1		
1.2.4	Coarse aggregate	ton	1		
1.2.5	150mm Blockwork	m ²	1		
1.2.6	200mm Blockwork	m ²	1		
1.2.7	Reinforcement fabric mesh.	m ²	1		
1.2.8	Reinforcement steel.	ton	1		
1.2.9	Concrete Class 25	m3	1		
1.2.10	Imported Fill	m3	1		
1.2.11	Hardcore	m3	1		
1.2.12	Formwork	m ²	1		
1.2.13	Petrol	L	1		
1.2.14	Diesel	L	1		
1.2.15	Lubricants	L	1		
1.2.16	Epoxy Paint	L	1		
1.2.17	Emulsion Paint	L	1		
1.2.18	Gloss Paint	L	1		
1.2.19	Wrought Finish Formwork	m ²	1		
1.2.20	Smooth Finish Formwork	m ²	1		
1.2.21	DN400 Gate Valve	No.	1		
1.2.22	DN500 Gate Valve	No.	1		
PAGE TOTAL FOR MATERIAL CARRIED TO SECTION COLLECTION SHEET					

DAYWORKS

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
1.3	<u>EQUIPMENT</u>				
	Rates to include for all operation and maintenance of equipment, cost of fueling and lubrication, etc.				
1.3.1	Excavator	hr	1.00		
1.3.2	Dozer 70Kw	hr	1.00		
1.3.3	Grader Tractor	hr	1.00		
1.3.4	Mobile generator 15 kVA	hr	1.00		
1.3.5	4 WD Pickup 1 tonne	hr	1.00		
1.3.6	Concrete mixer type 5/3.5	hr	1.00		
1.3.7	Concrete dumper 0.5 cu.m.	hr	1.00		
1.3.8	Concrete vibrator poker type N.D. 50 mm	hr	1.00		
1.3.9	Dewatering pump 50mm dia suction end	hr	1.00		
1.3.10	Air Compressor (5,000 l/min)	hr	1.00		
1.3.11	Tipper Truck 7 tonne	hr	1.00		
1.3.12	Tipper Truck 15 tonne	hr	1.00		
1.3.13	Oxy-acetylene cutting and welding set including oxygen and acetylene gases.	hr	1.00		
1.3.14	Electrical welding set including electrodes	hr	1.00		
PAGE TOTAL FOR EQUIPMENT CARRIED TO SECTION COLLECTION SHEET					

DAYWORKS

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE				
1	BROUGHT FORWARD FROM PAGE 1			-	
2	BROUGHT FORWARD FROM PAGE 2			-	
3	BROUGHT FORWARD FROM PAGE 3			-	
TOTAL CARRIED TO GRAND SUMMARY					

BILL NO. 1 - PRELIMINARIES AND GENERAL ITEMS

Item No	Description	Unit	QTY	Rate (KSh.)	Amount (KSh.)
CLASS A - GENERAL ITEMS					
Contractual Requirements					
A110	Performance Security	Sum			
A120.1	Insurance for Works	Sum			
A120.2	Insurance against workers Injury (WIBA)	Sum			
A120.3	Insurance against Injury to Third Party Persons and damage to third party properties	Sum			
Specified Requirements					
Offices and Accommodation for the Engineer's Staff					
A211.1	Provide Engineer's offices as specified or instructed by Engineer	prov sum			2,000,000
A211.2	Provisional sum for rented accommodation for Resident Engineer's Staff (3 No.)	month	18	100,000	1,800,000
A211.3	% Adjustment to the provisional sum for Item A211.1 to A211.2	%	3,800,000		-
Services for Engineer's Staff					
A221.1	Provisional sum for purchase of one (1) Double Cabin Pick-up Truck Vehicles (2800cc) for use by Engineer's Staff as instructed. Vehicles to revert to the Employer	Prov. Sum	1	6,000,000	6,000,000
A221.2	% Adjustment to the provisional sum for Items A221.1	%	6,000,000		-
A221.3	Maintenance/running costs of the vehicles for Engineer's staff over the period of contract. Rate to include fuelling, scheduled maintenance, insurance etc	km	50,000		-
Equipment for Engineer's Staff					
A231.1	Provisional sum for furnishing and equipping the R.E's offices. To include furniture, communication devices, laptop computers, digital cameras, printers, softwares and licenses e.t.c	Prov. sum			2,000,000
A231.3	% Adjustment to the provisional sum for Items A231.1 and A231.2	%	2,000,000		-
A231.3	Monthly maintenance of office equipment (printers, cameras, Software licenses etc) and survey equipment for use by the Engineer's Staff	month	18		-
A231.3	Monthly office supplies (stationery, consumables etc) for use by the Engineer's Staff	month	24		-
Attendance Upon Engineer's Staff					
A241	Attendance upon Engineer's Staff by drivers (2 No.)	month	36		-
A242	Attendance upon Engineer's staff by office administrative assistants (2 No)	month	36		-
A242	Attendance upon Engineer's staff by Survey assistants and chainmen (2 No)	month	36		-
Total C/F to Next Page					11,800,000

BILL NO. 1 - PRELIMINARIES AND GENERAL ITEMS

Item No	Description	Unit	QTY	Rate (KSh.)	Amount (KSh.)
---------	-------------	------	-----	-------------	---------------

BILL NO. 1 - PRELIMINARIES AND GENERAL ITEMS**(Continued)**

Item No	Description	Unit	Quantity	Rate (KSh.)	Amount (KSh.)
	Total B/F From Previous Page				11,800,000
	Testing of Materials and Works				
A250.1	Provisional sum for testing of materials as specified or directed by the Engineer	prov. sum			750,000
A250.2	% Adjustment to the provisional sum for Item A250.1	%	750,000		-
	Project Signboards and Plaque				
A279.1	Provision, fixing, maintaining and removal of site signboards	nr	3		-
	Other Provisional sums				
A279.4	Provisional Sum for fees requested by various national and county government authorities and public service agencies for relocation of services, permit fees etc	prov sum			5,000,000
A279.5	% Adjustment to the provisional sum for Item A279.4	%	5,000,000		-
	Method Related Charges				
	In addition to the items listed hereunder, a tenderer is to insert such items as he may decide to cover, items of work relating to his intended method of executing the works, costs of which are not to be considered as proportional to the quantities of the other items and for which he has not allowed in the rates and prices for the other items.				
	Accommodation, Buildings and Services				
A310	Establish, maintain and remove Contractor's camp including offices, stores, laboratories, cabins, canteens etc and services including electricity, water, security, transport, staff welfare etc	sum			-
A353	Establishment, operation and maintenance, and removal of de-watering plant/exhauster where necessary and approved by engineer	sum			
	Other Provisional Sums				
A421.1	Provisional Sum for Capacity Building, paid internships, seminars and trainings and community mobilization directed by the Engineer	Prov Sum			5,000,000
A430	Preparation, printing and submission of As-Built Drawings and O&M Manuals	Sum			
	Total C/F to Grand Summary Sheet				22,550,000

BILL NO. 2A GATINA AND KAWANGWARE WORKS					
Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
ABLUTION BLOCKS					
1	<u>ELEMENT NO.1</u> <u>SUBSTRUCTURES</u>				
	<i>Excavations</i>				
1.1	Excavate for foundation trenches n.e 1500mm deep from reduced level ditto.	m ³	59		-
1.2	Extra over excavations for excavating in class 1 rock at any depth	m ³	12		-
	<i>Disposal of excavated materials</i>				
1.3	Return fill and ram selected excavated materials around foundations	m ³	33		-
1.4	Load cart away to a distance not exceeding 100m	m ³	26		-
	<i>Planking & struting</i>				
1.5	Allow for planking and struting	ITEM	1		-
	<i>Disposal of water</i>				
1.6	Allow for keeping excavation free from all water	ITEM	1		-
	<i>Hardcore Filling</i>				
1.7	300mm thick fillings,rolled,levelled and compacted in 150mm layers to make up levels	m ²	41		-
1.8	50mm stone dust bliding to surface of hardcore	m ²	41		-
	<i>Damp Proof Membrane</i>				
1.9	Single layer of 1000gauge polythene sheeting laid on blinded hardcore with 150mm side laps to receive concrete	m ²	54		-
	<i>Anti-termite treatment</i>				
1.1	Treat surface of hardcore with 'Dieldrin' or similar approved anti-termite solution applied strictly in accordance with the manufacturer's instructions	m ²	54		-
2	<u>CONCRETE WORKS</u>				
	Plain concrete class C25/15 achieving characteristics compressive strength of 25N/mm ² at 28 days of 150mm cubes as per BS EN 12390:2019 in:				
2.1	50mm bliding to strip foundations	m ²	39		-
2.2	Strip foundations	m ³	8		-
2.3	150mm thick surface bed	m ²	54		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
	<i>Supply and fix steel bar reinforcement including bending, hooking, tying wire, cutting spacers and supporting all in position</i>				
2.4	High yield square twisted bar reinforcement to B.S 4661 Assorted	KG	800		-
2.5	Steel Fabric mesh reinforcement to B.S 4483 BRC mesh fabric reinforcement ref. A142 (weighing 2.2kg/m² laid in ramp (measured net-no allowance made for laps)	m²	54		-
2.6	Sawn formwork to vertical sides of strip footing	M	26		-
2.7	vertical edges of slab 75-150mm	M	30		-
3	MASONRY <i>Natural stone walling bedded in cement and sand mortar as be described</i>				
3.1	200mm thick walling Cement/sand (1:3)	m²	82		-
3.2	12mm thick external rendering to plinth surfaces finished smooth with a wood float	m²	9		-
3.3	prepare and apply two coats of bituminous paint to rendered surfaces externally	m²	9		-
4	R.C. SUPERSTRUCTURE <i>Vibrated Reinforced concrete class C20/20 achieving characteristics compressive strength of 20N/mm² at 28 days of 150mm cubes as per BS EN 12390:2019 in:</i>				
4.1	Beams	m³	4		-
4.2	High tensile square twisted to BS 4461 as described in:- Assorted	KG	480.00		-
4.3	Sawn formwork as described to:- Vertical sides and soffits of beams	m²	39		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS					
Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
5	EXTERNAL WALLING <i>Aproved bush hammered "blue stone" walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron in every alternate course</i>				
5.1	200mm thick walling	m ²	29		-
					-
	<i>Fine dressed natural stone walling, bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course.</i>				-
5.2	200mm thick walling	m ²	52		-
					-
	<i>labour & Sundries</i>				-
5.3	Extra over 200mm thick walling for zero joints	M	29		-
					-
					-
	<i>Approved hessian based damp proof course</i>				-
5.4	200mm wide hessian based bituminous felt damp proofing course laid and bedded on cement sand (1:4)	No	29		-
					-
6	INTERNAL WALLING <i>Fine dressed natural stone walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course</i>				-
					-
					-
6.1	200mm thick walling	m ²	19		-
					-
6.2	150mm thick walling	m ²	76		-
					-
	<i>Approved hessian based damp proof course</i>				-
6.3	200mm wide	m	6		-
					-
6.4	150mm wide	m	30		-
					-
					-
					-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
7	<u>ROOF CONTRUCTION & COVERING (PROVISIONAL)</u>				
	STRUCTURAL STEEL WORK <i>The Contractor to allow in his rate for gusset plates,brackets,bolts etc to the structure connections</i>				
7.1	Allowance for steel roof structure comprising RHS top and bottom cords,struts and ties and z purlins all to structural Engineers drawings and details	m ²	80		-
7.2	Sheet covering <i>Approved Asphalt shingles laid on steel roof structure and fixed as per manufactures instructions including all recquired accessories as ends,barrels,trim and flashings</i> Roof covering	m ²	80		-
7.3	Wrot Cypress 250 x030mm fascia or barge board	M	35		-
7.4	Eaves Fillings PVC tounge and grooved eaves fillings with mosquito gauge and ventilation opening to approval	m ²	21		-
7.5	Rainwater disposal (All provisional) <i>Approved PVC Gutter</i> U-shaped Pvc gutter fixed to fascia board with approved means	LM	35		-
7.6	100mm Diameter down pipes fixed to wall with brackets at 1200c/c	LM	14		-
8	<u>EXTRA OVER</u>				
8.1	100mm diameter outlets	NO	4		-
8.2	Rainwater swanneck bend	NO	4		-
8.3	Stopped end	NO	4		-
8.4	Rainwater anti-splash shoe	NO	4		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
8.5	PAINTING AND DECORATING <i>Knot,prime and prepare and apply three coats gloss exterior oil paint on wood surfaces to:</i> General surfaces of wood	m ²	20.00		
9	<u>WINDOWS</u>				
9.1	<i>Mazeras window coping</i> Windows cill size 200x25mm once sunk,weathered and throated,with 10mm drip paint to approval	M	11		
9.2	<i>Aluminium Casement Windows</i> <i>Supply,assemble and fix the following Aluminium framed windows,fabricated from approved composite extruded powder coated heavy duty approved standard hollow sections 100 x 50mm (minimum 2mm thick) including 6mm thick glazing secured on framing with approved with glazing strips and glazing beading including waterproofing all joints using silicon,sealing compounds and approved aluminium brackets;fixing with screws;building in lugs to jams,plugging and screwing head and cill,sealing with mastic,adjusting on completion and all neccessary ironmongery such as hinges,locking devices to architects details and Approval</i>				
10	<u>DOORS</u>				
10.1	Supply and fix 50mm thick wrot mahogany panelled door;overall size 900x2100mm high <i>Supply and fix the following 45mm thick(finished) semi solid core flush door faced both sides with interior quality plywood hardwood lipped all round all to archtects details and approval</i>	NO	2		
10.2	Door size 900x 2100mm high	NO	2		
10.3	Door size 800x 2100mm high <i>Ironmongery</i> <i>Supply and fix the following ironmongery complete with matching screws all as per "union" catalogue or other aqual and approved</i>	NO	6		
10.4	3-lever mortice door lock	NO	2		
10.5	2-lever mortice door lock	NO	8		
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS					
Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
10.6	100mm heavy duty steel butt hinges	NO	15		-
10.7	Aproved rubber door stop	NO	10		-
	FRAMES AND FINISHINGS				-
10.8	150x50mm frame with three labours,plugged	M	54		-
10.9	50x20mm rounded architrave with two labours	M	54		-
10.10	20mm diameter quadrant beading ditto.	M	54		-
11	<u>PAINTING AND DECORATING</u>				-
	<i>prepare and apply one coat aluminium primer on back of wood before fixing</i>				-
11.1	Surfaces no exceeding 100mm girth	M	108		-
11.2	Surfaces 200-300mm girth	M	54		-
	<i>prepare and apply three coats gloss oil paint to wood surfaces internally</i>				-
11.3	General surfaces over 100 and not exceeding 200mm girth	M	108		-
11.4	Surfaces 200-300mm girth	M	54		-
11.5	General surfaces of doors	M2	37		-
12	<u>EXTERNAL WALL FINISHES</u>				-
	<i>15mm thick render as described to :</i>				-
12.1	Sides of concrete or stone block surfaces	m ²	65		-
12.2	Doors and Windows reveals not exceeding 100mm girth	m ²	37		-
	<i>Prepare and apply one undercoat and two coats approved exterior paint to:</i>				-
12.3	Externally rendered surfaces	m ²	65		-
12.4	Ditto but not exceeding 100mm girth	M	37		-
13	<u>INTERNAL WALL FINISH</u>				-
	<i>20mm thick gauged lime plaster (1:2:9) as described to:</i>				-
13.1	Sides of walls or concrete surfaces	m ²	191		-
13.2	Door and window reveals not exceeding 100mm girth	m ²	77		-
	<i>15mm thick cement sand (1:4) in</i>				-
13.3	Backing to receive eramic wall tiles (measured seperately)	m ²	80		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS					
Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
13.4	Approved ceramic wall tiles as described 300x200x6mm thick tiles on screed backing (m.s) with straight joint	M	80		-
	<u>PAINTING AND DECORATING</u> <i>prepare and apply three coats plastic emulsion paint to:</i>				-
13.5	Plastered walls	m ²	191		-
13.6	Door and window reveals not exceeding 100mm girth.	M	77		-
14	<u>FLOOR FINISHES</u>				-
14.1	Cement and sand (1:4) screed as described in: 22mm thick backing to receive ceramic floor tiles	m ²	50		-
14.2	300x300x8mm approved non-slip ceramic tiles on screed backing (m.s) with straight joints and pointing in matching cement to floors paving floors	m ²	50		-
14.3	100mm high skirting	m ²	30		-
	<u>CEILING FINISHES</u>				-
14.4	12.5mm thick chip board ceiling including 100x50mm and 50x50mm bradering at 600mm centers both ways	m ²	50		-
14.5	<i>Wrot cypress</i> 75mm wide cornice	m ²	83		-
	<u>PAINTING AND DECORATING</u> <i>Prepare and apply one undercoat and three finishing coats of interior quality paint as crown solo pure satin emulsion or other equal and approved to</i>				-
	Surfaces of chipboard ceilings	m ²	83		-
14.6	<i>Prepare and apply three coats of polycurethane woodseal to boarding, according to manufacturers specifications</i> Surfaces of wood 0-100mm girth	m ²	50		-
PAGE TOTAL CARRIED TO COLLECTION SHEET(1 No.Ablution block)					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS					
Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
	SECTION COLLECTION PAGE FOR ABLUTION BLOCK				
1	BROUGHT FORWARD FROM PAGE 1				-
2	BROUGHT FORWARD FROM PAGE 2				-
3	BROUGHT FORWARD FROM PAGE 3				-
4	BROUGHT FORWARD FROM PAGE 4				-
5	BROUGHT FORWARD FROM PAGE 5				-
6	BROUGHT FORWARD FROM PAGE 6				-
7	BROUGHT FORWARD FROM PAGE 7				-
TOTAL FOR 1 ABLUTION BLOCK.					-
TOTAL FOR 2 ABLUTION BLOCK C/F to BILL 2A COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS					
Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
SIMPLIFIED SEWERS					
	<p><i>Consumer Connection Works will commence during the Construction Period and minimal works can extend to the Defects Liability Period (DLP). The connections will be carried out as soon as the simplified sewers are commissioned. Taking Over will be on completion of the Connections. The Contractor should allow for this in their rates. There will be no extra cost of carrying out the Connection Works during DLP.</i></p> <p><i>Typical Arrangement for a Consumer Sewer Connection is shown in the Standard Drawings.</i></p> <p><i>It is estimated that the approximate number of consumer sewer connections to be carried out in the Project Area is 300. The connection works are to be carried out in liaison with the respective Water Service Provider, who will receive, process and approve the applications for connections.</i></p> <p><i>The Contractor to obtain from Water Service Provider the exact number of connections and their locations before ordering materials and carrying out any works under this Bill.</i></p>				
1	CLASS I : PIPEWORK - PIPES				
1.11	Supply of Pipes <i>Excavation, laying and jointing is included in 'B' - Pipe Laying Supply, Transport to Site and Store. The rate to include jointing materials, bolts, gaskets, rubber rings, etc.</i>				
1.12	160mm outside diameter uPVC sewer pipe Class 41	m	6,000		-
1.13	200 mm outside diameter uPVC sewer pipe Class 41	m	4,000		-
1.2	Pipe Laying <i>The rate quoted shall be deemed to include excavation and backfilling with selected excavated material, of pipe trenches. The rates shall also include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority, transport of material from site store to working areas, laying and jointing of pipes and fittings.</i>				
1.21	160mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m	m	4,000		-
1.22	200 mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m	m	2,000		-
Total C/F to BILL 2A COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
2	CLASS J: FITTINGS AND VALVES				
	<i>Supply, transport to site, transport from site store lay, joint and test, 450 Concrete socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing material, rubber rings etc. The rate should also include mass concrete which will be required for reduction of the Y Junction to the respective service lines.</i>				
2.11	160 mm off 200 mm	Nr	100		-
2.12		Nr	350		-
2.13	355mm off 355	Nr	350		-
	<i>Supply, transport to site, transport from site store lay, joint and test, 450 uPVC socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing</i>				
2.14	160mm off 200	Nr	1000		-
2.15	160mm off 315	Nr	300		-
2.16	160mm off 400	Nr	300		-
3	CLASS K - PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES				
	Masonry Inspection Chambers Provide all materials, construct and test sewer inspection chambers of depth not exceeding 1.0m, internal dimensions 450mm x 600mm constructed with 150mm thick masonry walls reinforced with hoop irons at every alternate course as shown on Drawing. Each Chamber is to serve two plots. Include for provision and fixing of light duty rectangular mild steel frame and cover. The cover to be concrete filled as detailed. The rate should be inclusive of two flexible joints adjacent to the Inspection Chamber as detailed and provision				
3.11		Nr	1,500		-
	Crossings				
3.12	Allow for crossing existing boundary walls, including reinstatement to original state. Nominal bore not exceeding	Item			
3.13	Allow for crossing existing fences (chain link, barbed wire etc.), including reinstatement to original state. Nominal bore	Item			
Total C/F to BILL 2A COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS					
Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
4	CLASS L: PIPEWORK - ANCILLARIES TO LAYING AND EXCAVATION				
	Extras to excavation and backfilling in pipe trenches				
4.11	Excavation in rock (Provisional)	m ³	1,000		-
5	CLASS X: MISCELLANEOUS WORKS				
	Testing of the works				
5.1	Allow for water testing of the sewer conection including sewer pipes and inspection chambers as specified including all requisite Materials, Personnel, Testing Equipment etc. Include provision of all equipment and materials	m	10,000		-
HOUSEHOLDCONNECTION - Water Distributions					
6	<u>PIPE - FITTINGS - SUPPLY AND INSTALL</u>				
	Supply of HDPE pipes in lengths c/w electrofusion Couplers to SSRN 307 PE 100 - Minimum PN 12.5				
	<i>Distribution Pipelines</i>				
	<i>50mm diameter</i>				
6.11	Gatina	m	2,500		-
6.12	Kawamgware	m	500		-
6.13	Other	m	500		-
	<i>63 mm diameter</i>				
6.14	Gatina	m	500		-
6.15	Kawangware	m	1,000		-
	<i>90 mm diameter</i>				
6.16	All	m	500		-
	Supply of GI pipes in 12 m lengths				
	Class B Complete with Sockets Minimum PN 12.5				
	<i>Distribution Pipelines</i>				
6.17	40mm diameter class B GI pipes complete with sockets	m	30		-
6.18	80mm diameter class B GI pipes complete with sockets	m	30		-
6.19	50mm diameter class B GI pipes complete with sockets	m	24		-
7	FITTINGS				
7.11	110mm by 50mm diameter fabricated socketed saddle clamp	no	10		-
7.12	50mm master meter	no	10		-
7.13	50mm short nipple	no	6		-
7.14	32mm Air Valve ARI	no	6		-
7.15	Rubber gasket	m ²	5		-
7.16	50mm diameter gate valve[pegler original]	no	10		-
7.15	50mm valve socket	no	5		-
7.16	50mm diameter GI end cap	no	5		-
7.17	90mm diameter gate valve[pegler original]	no	3		-
7.18	90mm short nipple	no	5		-
7.19	90mm valve socket	no	5		-
7.2	90mm master meter	no	1		-
Total C/F to BILL 2A COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS					
Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
7.21	90mm diameter GI end cap	no	3		-
7.22	63mm diameter gate valve (pegler original)	no	4		-
7.23	63mm short nipple	no	1		-
7.24	63mm valve socket	no	4		-
7.25	63mm master meter	no	3		-
7.26	63mm diameter GI end cap	no	3		-
7.27	chamber	no	20		-
7.28	Tangit	kg	30		-
8	TESTING				
8.11	Test pressure not exc. 12 bar,	m	5,000		-
8.12	pipe n.b. exc 50 but not exc. 100 mm.				
9	STERILISATION AND FLUSHING				
9.11	pipe n.b. exc 50 but not exc. 100 mm.	m	5,000		-
Total C/F to BILL 2A COLLECTION SHEET					-

BILL NO. 2A GATINA AND KAWANGWARE WORKS					
Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
BILL NO. 2A GATINA AND KAWANGWARE COLLECTION SHEET					
	COLLECTION SHEET FOR ABLUTION BLOCKS, SIMPLIFIED SEWERS, HOUSEHOLD CONNECTIONS AND WATER DISTRIBUTION				
8	BROUGHT FORWARD FROM PAGE 8 (2 No. Ablution Blocks)				-
9	BROUGHT FORWARD FROM PAGE 9				-
10	BROUGHT FORWARD FROM PAGE 10				-
11	BROUGHT FORWARD FROM PAGE 11				-
11	BROUGHT FORWARD FROM PAGE 12				-
TOTAL CARRIED TO GRAND SUMMARY					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
ABLUTION BLOCKS					
1	<u>ELEMENT NO.1</u>				
	<u>SUBSTRUCTURES</u>				
	<i>Excavations</i>				
1.1	Excavate for foundation trenches n.e 1500mm deep from reduced level ditto.	m ³	59		-
1.2	Extra over excavations for excavating in class 1 rock at any depth	m ³	12		-
					-
	<i>Disposal of excavated materials</i>				-
1.3	Return fill and ram selected excavated materials around foundations	m ³	33		-
1.4	Load cart away to a distance not exceeding 100m	m ³	26		-
					-
	<i>Planking & strutting</i>				-
1.5	Allow for planking and strutting	ITEM	1		-
					-
	<i>Disposal of water</i>				-
1.6	Allow for keeping excavation free from all water	ITEM	1		-
					-
	<i>Hardcore Filling</i>				-
1.7	300mm thick fillings,rolled,levelled and compacted in 150mm layers to make up levels	M2	41		-
1.8	50mm stone dust bliding to surface of hardcore	M2	41		-
					-
	<i>Damp Proof Membrane</i>				-
1.9	Single layer of 1000gauge polythene sheeting laid on blinded hardcore with 150mm side laps to receive concrete	M2	54		-
					-
	<i>Anti-termite treatment</i>				-
1.1	Treat surface of hardcore with 'Dieldrin' or similar approved anti-termite solution applied strictly in accordance with the manufacturer's instructions	M2	54		-
Total C/F to BILL 2B COLLECTION SHEET					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
2	<u>CONCRETE WORKS</u> <i>Plain concrete class C25/15 achieving characteristics compressive strength of 25N/mm² at 28 days of 150mm cubes as per BS EN 12390:2019 in:</i>				
2.1	50mm bliding to strip foundations	M2	39		-
2.2	Strip foundations	m ³	8		-
2.3	150mm thick surface bed	M2	54		-
	<i>Supply and fix steel bar reinforcement including bending, hooking, tying wire, cutting spacers and supporting all in position</i>				-
	<i>High yield square twisted bar reinforcement to B.S 4661</i>				-
2.4	Assorted	KG	800		-
	<i>Steel Fabric mesh reinforcement to B.S 4483</i>				-
2.5	BRC mesh fabric reinforcement ref. A142 (weighing 2.2kg/m ² laid in ramp (measured net-no allowance made fo laps)	M2	54		-
	<i>Sawn formwork to</i>				-
2.6	vertical sides of strip footing	M	26		-
2.7	vertical edges of slab 75-150mm	M	30		-
					-
					-
3	<u>MASONRY</u> <i>Natural stone walling bedded in cement and sand mortar as before described</i>				-
3.1	200mm thick walling Cement/sand (1:3)	M2	82		-
Total C/F to BILL 2B COLLECTION SHEET					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
3.2	12mm thick external rendering to plinth surfaces finished smooth with a wood float	M2	9		-
3.3	prepare and apply two coats of bituminous paint to rendered surfaces externally	M2	9		-
4	R.C.SUPERSTRUCTURE				-
	Vibrated Reinforced concrete class C20/20 achieving characteristics compressive strength of 20N/mm ² at 28days of 150mm cubes as per BS standard of 15th August.2005 in :				-
4.1	Beams	m ³	4		-
	High tensile square twisted to BS 4461 as described in:-				-
4.2	Assorted	KG	480.00		-
	Sawn formwork as described to:-				-
4.3	Vertical sides and soffits of beams	M2	39		-
5	EXTERNAL WALLING				-
	Aproved bush hammered "blue stone" walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron in every alternate course				-
5.1	200mm thick walling	M2	29		-
	Fine dressed natural stone walling,bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course.				-
5.2	200mm thick walling	M2	52		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>labour& Sundries</u>				
5.3	Extra over 200mm thick walling for zero joints	M	29		-
					-
					-
	<u>Approved hessian based damp proof course</u>				-
					-
5.6	200mm wide hessian based bituminous felt damp proofing course laid and bedded on cement sand (1:4)	NO	29		-
6	<u>INTERNAL WALLING</u>				-
					-
	Fine dressed natural stone walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course				-
6.1	200mm thick walling	M2	19		-
6.2	150mm thick walling	m2	76		-
					-
	<u>Approved hessian based damp proof course</u>				-
					-
6.3	200mm wide	m	6		-
6.4	150mm wide	m	30		-
7	<u>ROOF CONTRUCTION & COVERING (PROVISIONAL)</u>				-
	<u>STRUCTURAL STEEL WORK</u>				-
	The Contractor to allow in his rate for gusset plates,brackets,bolts etc to the structure connections				-
					-
7.1	Allowance for steel roof structure comprising RHS top and bottom cords,struts and ties and z purlins all to structural Engineers drawings and details	M2	80		-
	Sheet covering				
	Approved Asphalt shingles laid on steel roof structure and fixed as per manufactures instructions including all recquired accessories as ends,barrels,trim and flashings				
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
<u>ABLUTION BLOCKS</u>					
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
7.2	Roof covering	M2	80		-
	<u>Wrot Cypress</u>				-
7.3	250 x030mm fascia or barge board	M	35		-
	<u>Eaves Fillings</u>				-
7.4	PVC tounge and grooved eaves fillings with mosquito gauge and ventilation opening to approval	M2	21		-
	<u>Rainwater disposal (All provisional)</u>				-
	<u>Approved PVC Gutter</u>				-
7.5	U-shaped Pvc gutter fixed to fascia board with approved means	LM	35		-
7.6	100mm Diameter down pipes fixed to wall with brackets at 1200c/c	LM	14		-
8	<u>EXTRA OVER</u>				-
8.1	100mm diameter outlets	NO	4		-
8.2	Rainwater swanneck bend	NO	4		-
8.3	Stopped end	NO	4		-
8.4	Rainwater anti-splash shoe	NO	4		-
	PAINTING AND DECORATING				-
	Knot,prime and prepare and apply three coats gloss exterior oil paint on wood surfaces to:				-
8.5	General surfaces of wood	M2	20.00		-
9	<u>WINDOWS</u>				-
	Mazeras window coping				-
9.1	Windows cill size 200x25mm once sunk,weathered and throated,with 10mm drip paint to approval	M	11		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (KShs.)	Amount (KShs.)
<u>ABLUTION BLOCKS</u>					
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>Aluminium Casement Windows</u> Supply,assemble and fix the following Aluminium framed windows,fabricated from approved composite extruded powder coated heavy duty approved standard hollow sections 100 x 50mm (minimum 2mm thick) including 6mm thick glazing secured on framing with approved with glazing strips and glazing beading including waterproofing all joints using silicon,sealing compounds and approved aluminium brackets;fixing with screws;building in lugs to jams,plugging and screwing head and cill,sealing with mastic,adjusting on completion and all necessary ironmongery such as hinges,locking devices to architects details and Approval				
9.2	Windows overall size 1620 x 600mm high	NO	6		-
10	<u>DOORS</u>				-
10.1	Supply and fix 50mm thick wrot mahogany panelled door;overall size 900x2100mm high	NO	2		-
					-
	Supply and fix the following 45mm thick(finished) semi solid core flush door faced both sides with interior quality plywood hardwood lipped all round all to architects details and approval				-
10.2	Door size 900x 2100mm high	NO	2		-
10.3	Door size 800x 2100mm high	NO	6		-
	Ironmongery Supply and fix the following ironmongery complete with matching screws all as per "union" catalogue or other aqual and approved				
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
10.4	3-lever mortice door lock	NO	2		-
10.5	2-lever mortice door lock	NO	8		-
10.6	100mm heavy duty steel butt hinges	NO	15		-
10.7	Aproved rubber door stop	NO	10		-
	<u>FRAMES AND FINISHINGS</u>				-
10.8	150x50mm frame with three labours,plugged	M	54		-
10.9	50x20mm rounded architrave with two labours	M	54		-
10.10	20mm diameter quadrant beading ditto.	M	54		-
11	<u>PAINTING AND DECORATING</u>				-
	prepare and apply one coat aluminiumprimer on back of wood before fixing				-
11.1	Surfaces no exceeding 100mm girth	M	108		-
11.2	surfaces 200-300mm girth	M	54		-
	prepare and apply three coats gloss oil paint to wood surfaces internally				-
11.3	General surfaces over 100 and not exceeding 200mm girth	M	108		-
11.4	Surfaces 200-300mm girth	M	54		-
11.5	general surfaces of doors	M2	37		-
12	<u>EXTERNAL WALL FINISHES</u>				-
	15mm thick render as described to :				-
12.1	Sides of concrete or stone block surfaces	M2	65		-
12.2	Doors and Windows reveals not exceeding 100mm girth	M2	37		-
	prepare and apply one undercoat and two coats approved exterior paint to:				-
12.3	Externally rendered surfaces	M2	65		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
12.4	Ditto but not exceeding 100mm girth	M	37		-
13	<u>INTERNAL WALL FINISH</u>				-
	20mm thick gauged lime plaster (1:2:9) as described to:				-
13.1	Sides of walls or concrete surfaces	M2	191		-
13.2	Door and window reveals not exceeding 100mm girth	M2	77		-
	15mm thick cement sand (1:4) in				-
13.3	Backing to receive eramic wall tiles (measured seperately)	M2	80		-
	Approved ceramic wall tiles as described				-
13.4	300x200x6mm thixk tiles on screed backing (m.s) with straight joint	M	80		-
	<u>PAINTING AND DECORATING</u>				-
	prepare and apply three coats plastic emulsion paint to:				-
13.5	Plastered walls	M2	191		-
13.6	Door and window reveals not exceeding 100mm girth.	M	77		-
14	FLOOR FINISHES				-
	Cement and sand (1:4) screed as described in:				-
14.1	22mm thick backing to receive ceramic floor tiles	M2	50		-
	300x300x8mm approved non-slip ceramic tiles on screed backing (m.s) with straight joints and pointing in matching cement to floors				-
14.2	paving floors	M2	50		-
14.3	100mm high skirting	M2	30		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>CEILING FINISHES</u>				
14.4	12.5mm thick chip board ceiling including 100x50mm and 50x50mm bradering at 600mm centers both ways	M2	50		-
	Wrot cypress				-
14.5	75mm wide cornice	M2	83		-
	PAINTING AND DECORATING				-
	prepare and apply one undercoat and three finishing coats of interior quality paint as crown solo pure satin emulsion or other equal and approved to				-
	Surfaces of chipboard ceilings	m2	83		-
	prepare and apply three coats of polycurerethane woodseal to boarding,according to manufacturers specifications				-
14.6	Surfaces of wood 0-100mm girth	M2	50		-
					-
BILL TOTAL CARRIED TO COLLECTION PAGE					-

BILL NO. 2B WAITHAKA AND RIRUTA

Item No	Description	Unit	QTY	Rate (Kshs.)	Amount (Kshs.)

BILL NO. 2A GATINA AND KAWANGWARE COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE ABLUTION				
1	BROUGHT FORWARD FROM PAGE 1			-	
2	BROUGHT FORWARD FROM PAGE 2			-	
3	BROUGHT FORWARD FROM PAGE 3			-	
4	BROUGHT FORWARD FROM PAGE 4			-	
5	BROUGHT FORWARD FROM PAGE 5			-	
6	BROUGHT FORWARD FROM PAGE 6			-	
7	BROUGHT FORWARD FROM PAGE 7			-	
8	BROUGHT FORWARD FROM PAGE 8			-	
9	BROUGHT FORWARD FROM PAGE 9			-	
TOTAL FOR 1 ABLUTION BLOCK.					-
TOTAL FOR 2 No. ABLUTION BLOCKS					-

BILL NO. 3A KAYOLE SOWETO,MATOPENI ,KAMOLA,VUMILIA ,KARSAN
ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
1	<u>ELEMENT NO.1</u>				
	<u>SUBSTRUCTURES</u>				
	Excavations				
1.1	Excavate for foundation trenches n.e 1500mm deep from reduced level ditto.	m ³	59		-
1.2	Extra over excavations for excavating in class 1 rock at any depth	m ³	12		-
	Disposal of excavated materials				
1.3	<u>Return fill and ram selected excavated materials around foundations</u>	m ³	33		-
1.4	<u>Load cart away to a distance not exceeding 100m</u>	m ³	26		-
	Planking & strutting				
1.5	Allow for planking and strutting	ITEM	1		-
	Disposal of water				
1.6	Allow for keeping excavation free from all water	ITEM	1		-
	Hardcore Filling				
1.7	300mm thick fillings,rolled,levelled and compacted in 150mm layers to make up levels	M2	41		-
1.8	50mm stone dust bliding to surface of hardcore	M2	41		-
	Damp Proof Membrane				
1.9	Single layer of 1000gauge polythene sheeting laid on blinded hardcore with 150mm side laps to receive concrete	M2	54		-
	Anti-termite treatment				
1.1	Treat surface of hardcore with 'Dieldrin' or similar approved anti-termite solution applied strictly in accordance with the manufacturer's instructions	M2	54		-
2	<u>Concrete Work</u>				
	Plain concrete class c12/15 achieving characteristics compressive strength of 25n/mm ² <u>at 28 days of 150mm cubes as per BS stardard of 15th August,2005 in:</u>				
2.1	50mm bliding to strip foundations	M2	39		-
2.2	Strip foundations	m ³	8		-
2.3	150mm thick surface bed	M2	54		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					
					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>Supply and fix steel bar reinforcement including bending, hooking, tying wire, cutting spacers and supporting all in position</u>				
2.4	High yield square twisted bar reinforcement to B.S 4661 Assorted	KG	800		-
2.5	<u>Steel Fabric mesh reinforcement to B.S 4483</u> BRC mesh fabric reinforcement ref. A142 (weighing 2.2kg/m² laid in ramp (measured net-no allowance made for laps)	M2	54		-
2.6	Sawn formwork to vertical sides of strip footing	M	26		-
2.7	vertical edges of slab 75-150mm	M	30		-
3	masonry Natural stone walling bedded in cement and sand mortar as before described				
3.1	200mm thick walling Cement/sand (1:3)	M2	82		-
3.2	12mm thick external rendering to plinth surfaces finished smooth with a wood float	M2	9		-
3.3	prepare and apply two coats of bituminous paint to rendered surfaces externally	M2	9		-
4	R.C.SUPERSTRUCTURE ALL PROVISIONAL Vibrated Reinforced concrete class C20/20 achieving characteristics compressive strength of 20N/mm² at 28 days of 150mm cubes as per BS standard of 15th August.2005 in :				
4.1	Beams High tensile square twisted to BS 4461 as described in:-	m³	4		-
4.2	Assorted	KG	480.00		-
4.3	Sawn formwork as described to:- Vertical sides and soffits of beams	M2	39		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

[illegible]

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
7	<u>ROOF CONTRUCTION & COVERING (PROVISIONAL)</u>				
	<u>STRUCTURAL STEEL WORK</u>				
	The Contractor to allow in his rate for gusset plates,brackets,bolts etc to the structure connections				
7.1	Allowance for steel roof structure comprising RHS top and bottom cords,struts and ties and z purlins all to structural Engineers drawings and details	m ²	80		-
	Sheet covering				-
	Approved Asphalt shingles laid on steel roof structure and fixed as per manufactures instructions including all recquired accessories as ends,barrels,trim and flashings				-
7.2	Roof covering	m ²	80		-
	<u>Wrot Cypress</u>				-
7.3	250 x030mm fascia or barge board	M	35		-
	<u>Eaves Fillings</u>				-
7.4	PVC toungue and grooved eaves fillings with mosquito gauge and ventilation opening to approval	m ²	21		-
	<u>Rainwater disposal (All provisional)</u>				-
	<u>Approved PVC Gutter</u>				-
7.5	U-shaped Pvc gutter fixed to fascia board with approved means	LM	35		-
7.6	100mm Diameter down pipes fixed to wall with brackets at 1200c/c	LM	14		-
8	<u>EXTRA OVER</u>				-
8.1	100mm diameter outlets	NO	4		-
8.2	Rainwater swanneck bend	NO	4		-
8.3	Stopped end	NO	4		-
8.4	Rainwater anti-splash shoe	NO	4		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	PAINTING AND DECORATING				
	Knot,prime and prepare and apply three coats gloss exterior oil paint on wood surfaces to:				
8.5	General surfaces of wood	m ²	20.00		-
					-
9	<u>WINDOWS</u>				-
					-
	Mazeras window coping				-
					-
9.1	Windows cill size 200x25mm once sunk,weathered and throated,with 10mm drip paint to approval	M	11		-
					-
	<u>Aluminium Casement Windows</u>				-
	Supply,assemble and fix the following Aluminium framed windows,fabricated from approved composite extruded powder coated heavy duty approved stardard hollow sections 100 x 50mm (minimum 2mm thick) including 6mm thick glazing secured on framing with approved with glazing strips and glazing beading including waterproofing all joints using silicon,sealing compounds and approved aluminium brackets;fixing with screws;building in lugs to jams,plugging and screwing head and cill,sealing with mastic,adjusting on completion and all neccessary ironmongery such as hinges,locking devices to architects details and Approval				-
					-
9.2	Windows overall size 1620 x 600mm high	NO	6		-
					-
10	<u>DOORS</u>				-
10.1	Supply and fix 50mm thick wrot mahogany panelled door;overall size 900x2100mm high	NO	2		-
					-
	Supply and fix the following 45mm thick(finished) semi solid core flush door faced both sides with interior quality plywood hardwood lipped all round all to archtects details and approval				-
10.2	Door size 900x 2100mm high	NO	2		-
					-
10.3	Door size 800x 2100mm high	NO	6		-
	Ironmongery				-
	Supply and fix the following ironmongery complete with matching screws all as per "union" catalogue or other aqual and approved				-
					-
10.4	3-lever mortice door lock	NO	2		-
					-
10.5	2-lever mortice door lock	NO	8		-
					-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
10.6	100mm heavy duty steel butt hinges	NO	15		-
10.7	Aproved rubber door stop	NO	10		-
	<u>FRAMES AND FINISHINGS</u>				-
10.8	150x50mm frame with three labours,plugged	M	54		-
10.9	50x20mm rounded architrave with two labours	M	54		-
10.10	20mm diameter quadrant beading ditto.	M	54		-
11	<u>PAINTING AND DECORATING</u>				-
	prepare and apply one coat aluminiumprimer on back of wood before fixing				-
11.1	Surfaces no exceeding 100mm girth	M	108		-
11.2	surfaces 200-300mm girth	M	54		-
	prepare and apply three coats gloss oil paint to wood surfaces internally				-
11.3	General surfaces over 100 and not exceeding 200mm girth	M	108		-
11.4	Surfaces 200-300mm girth	M	54		-
11.5	general surfaces of doors	M2	37		-
12	<u>EXTERNAL WALL FINISHES</u>				-
	15mm thick render as described to :				-
12.1	Sides of concrete or stone block surfaces	m ²	65		-
12.2	Doors and Windows reveals not exceeding 100mm girth	m ²	37		-
	prepare and apply one undercoat and two coats approved exterior paint to:				-
12.3	Externally rendered surfaces	m ²	65		-
12.4	Ditto but not exceeding 100mm girth	M	37		-
13	<u>INTERNAL WALL FINISH</u>				-
	20mm thick gauged lime plaster (1:2:9) as described to:				-
13.1	Sides of walls or concrete surfaces	m ²	191		-
13.2	Door and window reveals not exceeding 100mm girth	m ²	77		-
	15mm thick cement sand (1:4) in				-
13.3	Backing to receive eramic wall tiles (measured seperately)	m ²	80		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	Approved ceramic wall tiles as described				
13.4	300x200x6mm thixk tiles on screed backing (m.s) with straight joint	M	80		-
					-
	<u>PAINTING AND DECORATING</u>				-
	prepare and apply three coats plastic emulsion paint to:				-
					-
13.5	Plastered walls	m ²	191		-
					-
13.6	Door and window reveals not exceeding 100mm girth.	M	77		-
					-
14	FLOOR FINISHES				-
	Cement and sand (1:4) screed as described in:				-
					-
14.1	22mm thick backing to receive ceramic floor tiles	m ²	50		-
					-
	300x300x8mm approved non-slip ceramic tiles on screed backing (m.s) with straight joints and pointing in matching cement to floors				-
					-
14.2	paving floors	m ²	50		-
					-
14.3	100mm high skirting	m ²	30		-
					-
	<u>CEILING FINISHES</u>				-
					-
14.4	12.5mm thick chip board ceiling including 100x50mm and 50x50mm bradering at 600mm centers both ways	m ²	50		-
					-
	Wrot cypress				-
					-
					-
14.5	75mm wide cornice	m ²	83		-
					-
	PAINTING AND DECORATING				-
	prepare and apply one undercoat and three finishing coats of interior quality paint as crown solo pure satin emulsion or other equal and approved to				-
	Surfaces of chipboard ceilings	m2	83		-
					-
	prepare and apply three coats of polycurerethane woodseal to boarding,according to manufacturers specifications				-
14.6	Surfaces of wood 0-100mm girth	m ²	50		-
					-
					-
	PAGE TOTAL CARRIED TO COLLECTION SHEET(1 No.Ablution block)				-

SIMPLIFIED SEWERS

ITEM No.	DESCRIPTION	Unit	Qty	Rate	Amount (Kshs.)
	Consumer Connection Works will commence during the Construction Period and minimal works can extend to the Defects Liability Period (DLP). The connections will be carried out as soon as the simplified sewers are commissioned. Taking Over will be on completion of the Connections. The Contractor should allow for this in their rates. There will be no extra cost of carrying out the Connection Works during DLP.				
	Typical Arrangement for a Consumer Sewer Connection is shown in the Standard Drawings.				
	It is estimated that the approximate number of consumer sewer connections to be carried out in the Project Area is 200. The connection works are to be carried out in liason with with the respective Water Service Provider, who will receive, process and approve the applications for connections.				
	The Contractor to obtain from Water Service Provider the exact number of connections and their locations before ordering materials and carrying out any works under this Bill.				
1	CLASS I : PIPEWORK - PIPES				
1.11	Supply of Pipes				
	Excavation, laying and jointing is included in 'B' - Pipe Laying Supply, Transport to Site and Store. The rate to include jointing materials, bolts, gaskets, rubber rings, etc.				
1.12	160mm outside diameter uPVC sewer pipe Class 41	m	1,000		-
1.13	200 mm outside diameter uPVC sewer pipe Class 41	m	3,000		-
1.2	Pipe Laying				
	The rate quoted shall be deemed to include excavation and backfilling with selected excavated material, of pipe trenches. The rates shall also include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority, transport of material from site store to working areas, laying and jointing of pipes and fittings.				
1.21	160mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m	m	1,000		-
1.22	200 mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m	m	3,000		-
Total C/F to Next Page					-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				(KShs.)	
2	CLASS J: FITTINGS AND VALVES				
	Supply, transport to site, transport from site store lay, joint and test, 450 Concrete socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing material, rubber rings etc. The rate should also include mass concrete which will be required for reduction of the Y Junction to the respective service lines.				
2.11	160 mm off 200 mm	Nr	100		-
2.12		Nr	350		-
2.13	355mm off 355	Nr	350		-
	Supply, transport to site, transport from site store lay, joint and test, 450 uPVC socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing				
2.14	160mm off 200	Nr	1000		-
2.15	160mm off 315	Nr	300		-
2.16	160mm off 400	Nr	300		-
3	CLASS K - PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES				
	Masonry Inspection Chambers				
3.11	Provide all materials, construct and test sewer inspection chambers of depth not exceeding 1.0m, internal dimensions 450mm x 600mm constructed with 150mm thick masonry walls reinforced with hoop irons at every alternate course as shown on Drawing. Each Chamber is to serve two plots. Include for provision and fixing of light duty rectangular mild steel frame and cover. The cover to be concrete filled as detailed. The rate should be inclusive of two flexible joints adjacent to the Inspection Chamber as detailed and provision	Nr	500		-
	Crossings				
3.12	Allow for crossing existing boundary walls, including reinstatement to original state. Nominal bore not exceeding	Item			
3.13	Allow for crossing existing fences (chain link, barbed wire etc.), including reinstatement to original state. Nominal bore	Item			
Total C/F to Next Page					-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (KShs.)	AMOUNT
4	CLASS L: PIPEWORK - ANCILLARIES TO LAYING AND EXCAVATION				
	Extras to excavation and backfilling in pipe trenches				
4.11	Excavation in rock (Provisional)	m ³	1,000		-
5	CLASS X: MISCELLANEOUS WORKS				
	Testing of the works				
5.1	Allow for water testing of the sewer conection including sewer pipes and inspection chambers as specified including all requisite Materials, Personnel, Testing Equipment etc. Include provision of all equipment and materials	m	4,000		-
	HOUSEHOLD CONNECTION - Water Distributions				
6	<u>PIPE - FITTINGS - SUPPLY AND INSTALL</u>				
	Supply of HDPE pipes in lengths c/w electrofusion Couplers to SSRN 307 PE 100 - Minimum PN 12.5				
	<u>Distribution Pipelines</u>				
	<u>50mm diameter</u>				
6.11	Gatina	m	2,500		-
6.12	Kawamgware	m	500		-
6.13	Other	m	500		-
	<u>63 mm diameter</u>				
6.14	Gatina	m	500		-
6.15	Kawangware	m	1,000		-
	<u>90 mm diameter</u>				
6.16	All	m	500		-
	Supply of GI pipes in 12 m lengths				
	Class B Complete with Sockets Minimum PN 12.5				
	<u>Distribution Pipelines</u>				
	40mm diameter class B GI pipes complete with sockets	m	30		-
	80mm diameter class B GI pipes complete with sockets	m	30		-
	50mm diameter class B GI pipes complete with sockets	m	24		-
7	FITTINGS				
7.11	110mm by 50mm diameter fabricated socketed saddle clamp	no	10		-
7.12	50mm master meter	no	10		-
7.13	50mm short nipple	no	6		-
7.14	32mm Air Valve ARI	no	6		-
7.15	Rubber gasket	m ²	5		-
7.16	50mm diameter gate valve[pegler original]	no	10		-
7.15	50mm valve socket	no	5		-
7.16	50mm diameter GI end cap	no	5		-
7.17	90mm diameter gate valve[pegler original]	no	3		-
7.18	90mm short nipple	no	5		-
7.19	90mm valve socket	no	5		-
7.2	90mm master meter	no	1		-
	Total C/F to Next Page				-

[illegible]

BILL NO. 2A GATINA AND KAWANGWARE COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE ABLUTION				
1	BROUGHT FORWARD FROM PAGE 1			-	
2	BROUGHT FORWARD FROM PAGE 2			-	
3	BROUGHT FORWARD FROM PAGE 3			-	
4	BROUGHT FORWARD FROM PAGE 4			-	
5	BROUGHT FORWARD FROM PAGE 5			-	
6	BROUGHT FORWARD FROM PAGE 6			-	
7	BROUGHT FORWARD FROM PAGE 7			-	
TOTAL FOR 1 ABLUTION BLOCK.					-
TOTAL FOR 2 No. ABLUTION BLOCKS					-

BILL NO. 2A GATINA AND KAWANGWARE COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE SIMPLIFIED SEWERS, HH AND WATER DISTRIBUTION				
	BROUGHT FORWARD FROM ABOVE			-	
8	BROUGHT FORWARD FROM PAGE 8			-	
9	BROUGHT FORWARD FROM PAGE 9			-	
10	BROUGHT FORWARD FROM PAGE 10			-	
11	BROUGHT FORWARD FROM PAGE 11			-	
TOTAL CARRIED TO GRAND SUMMARY					-

BILL NO. 3B MUKURU INFORMAL SETTLEMENTS WORKS
ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
1	<u>ELEMENT NO.1</u> <u>SUBSTRUCTURES</u> Excavations				
1.1	Excavate for foundation trenches n.e 1500mm deep from reduced level ditto.	m ³	59		-
1.2	Extra over excavations for excavating in class 1 rock at any depth	m ³	12		-
	Disposal of excavated materials				
1.3	<u>Return fill and ram selected excavated materials around foundations</u>	m ³	33		-
1.4	<u>Load cart away to a distance not exceeding 100m</u>	m ³	26		-
	Planking & strutting				
1.5	Allow for planking and strutting	ITEM	1		-
	Disposal of water				
1.6	Allow for keeping excavation free from all water	ITEM	1		-
	Hardcore Filling				
1.7	300mm thick fillings,rolled,levelled and compacted in 150mm layers to make up levels	M2	41		-
1.8	50mm stone dust bliding to surface of hardcore	M2	41		-
	Damp Proof Membrane				
1.9	Single layer of 1000gauge polythene sheeting laid on blinded hardcore with 150mm side laps to receive concrete	M2	54		-
	Anti-termite treatment				
1.1	Treat surface of hardcore with 'Dieldrin' or similar approved anti-termite solution applied strictly in accordance with the manufacturer's instructions	M2	54		-
2	<u>Concrete Work</u> Plain concrete class c12/15 achieving characteristics compressive strength of 25n/mm ² <u>at 28 days of 150mm cubes as per BS stardard of 15th August,2005 in:</u>				
2.1	50mm bliding to strip foundations	M2	39		-
2.2	Strip foundations	m ³	8		-
2.3	150mm thick surface bed	M2	54		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					
					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>Supply and fix steel bar reinforcement including bending, hooking, tying wire, cutting spacers and supporting all in position</u>				
2.4	High yield square twisted bar reinforcement to B.S 4661 Assorted	KG	800		-
2.5	<u>Steel Fabric mesh reinforcement to B.S 4483</u> BRC mesh fabric reinforcement ref. A142 (weighing 2.2kg/m² laid in ramp (measured net-no allowance made for laps)	M2	54		-
2.6	Sawn formwork to vertical sides of strip footing	M	26		-
2.7	vertical edges of slab 75-150mm	M	30		-
3	masonry Natural stone walling bedded in cement and sand mortar as before described				
3.1	200mm thick walling Cement/sand (1:3)	M2	82		-
3.2	12mm thick external rendering to plinth surfaces finished smooth with a wood float	M2	9		-
3.3	prepare and apply two coats of bituminous paint to rendered surfaces externally	M2	9		-
4	R.C.SUPERSTRUCTURE ALL PROVISIONAL Vibrated Reinforced concrete class C20/20 achieving characteristics compressive strength of 20N/mm² at 28 days of 150mm cubes as per BS standard of 15th August.2005 in :				
4.1	Beams High tensile square twisted to BS 4461 as described in:-	m³	4		-
4.2	Assorted	KG	500		-
4.3	Sawn formwork as described to:- Vertical sides and soffits of beams	M2	39		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
5	EXTERNAL WALLING				
	Aproved bush hammered "blue stone" walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron in every alternate course				
5.1	200mm thick walling	m ²	29		-
					-
	Fine dressed natural stone walling,bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course.				-
					-
5.2	200mm thick walling	m ²	52		-
					-
	<u>labour& Sundries</u>				-
					-
5.3	Extra over 200mm thick walling for zero joints	M	29		-
					-
					-
	<u>Approved hessian based damp proof course</u>				-
					-
5.6	200mm wide hessian based bituminous felt damp proofing course laid and bedded on cement sand (1:4)	NO	29		-
6	<u>INTERNAL WALLING</u>				-
					-
	Fine dressed natural stone walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course				-
					-
6.1	200mm thick walling	m ²	19		-
					-
6.2	150mm thick walling	m ²	76		-
					-
	<u>Approved hessian based damp proof course</u>				-
					-
6.3	200mm wide	m	6		-
					-
6.4	150mm wide	m	30		-
					-
					-
					-
					-
					-
					-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
7	<u>ROOF CONTRUCTION & COVERING (PROVISIONAL)</u>				
	<u>STRUCTURAL STEEL WORK</u>				
	The Contractor to allow in his rate for gusset plates,brackets,bolts etc to the structure connections				
7.1	Allowance for steel roof structure comprising RHS top and bottom cords,struts and ties and z purlins all to structural Engineers drawings and details	m ²	80		-
					-
	Sheet covering				-
	Approved Asphalt shingles laid on steel roof structure and fixed as per manufactures instructions including all recquired accessories as ends,barrels,trim and flashings				-
					-
7.2	Roof covering	m ²	80		-
					-
	<u>Wrot Cypress</u>				-
					-
7.3	250 x030mm fascia or barge board	M	35		-
					-
	<u>Eaves Fillings</u>				-
					-
7.4	PVC tounge and grooved eaves fillings with mosquito gauge and ventilation opening to approval	m ²	21		-
					-
	<u>Rainwater disposal (All provisional)</u>				-
	<u>Approved PVC Gutter</u>				-
					-
7.5	U-shaped Pvc gutter fixed to fascia board with approved means	LM	35		-
7.6	100mm Diameter down pipes fixed to wall with brackets at 1200c/c	LM	14		-
					-
8	<u>EXTRA OVER</u>				-
					-
8.1	100mm diameter outlets	NO	4		-
					-
8.2	Rainwater swanneck bend	NO	4		-
					-
8.3	Stopped end	NO	4		-
					-
8.4	Rainwater anti-splash shoe	NO	4		-
					-
					-
					-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	PAINTING AND DECORATING				
	Knot,prime and prepare and apply three coats gloss exterior oil paint on wood surfaces to:				
8.5	General surfaces of wood	m ²	20.00		-
9	<u>WINDOWS</u>				-
	Mazeras window coping				-
9.1	Windows cill size 200x25mm once sunk,weathered and throated,with 10mm drip paint to approval	M	11		-
	<u>Aluminium Casement Windows</u>				-
	Supply,assemble and fix the following Aluminium framed windows,fabricated from approved composite extruded powder coated heavy duty approved stardard hollow sections 100 x 50mm (minimum 2mm thick) including 6mm thick glazing secured on framing with approved with glazing strips and glazing beading including waterproofing all joints using silicon,sealing compounds and approved aluminium brackets;fixing with screws;building in lugs to jams,plugging and screwing head and cill,sealing with mastic,adjusting on completion and all neccessary ironmongery such as hinges,locking devices to architects details and Approval				-
9.2	Windows overall size 1620 x 600mm high	NO	6		-
10	<u>DOORS</u>				-
10.1	Supply and fix 50mm thick wrot mahogany panelled door;overall size 900x2100mm high	NO	2		-
	Supply and fix the following 45mm thick(finished) semi solid core flush door faced both sides with interior quality plywood hardwood lipped all round all to archtects details and approval				-
10.2	Door size 900x 2100mm high	NO	2		-
10.3	Door size 800x 2100mm high	NO	6		-
	Ironmongery				-
	Supply and fix the following ironmongery complete with matching screws all as per "union" catalogue or other aqual and approved				-
10.4	3-lever mortice door lock	NO	2		-
10.5	2-lever mortice door lock	NO	8		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
10.6	100mm heavy duty steel butt hinges	NO	15		-
10.7	Aproved rubber door stop	NO	10		-
	<u>FRAMES AND FINISHINGS</u>				-
10.8	150x50mm frame with three labours,plugged	M	54		-
10.9	50x20mm rounded architrave with two labours	M	54		-
10.10	20mm diameter quadrant beading ditto.	M	54		-
11	<u>PAINTING AND DECORATING</u>				-
	prepare and apply one coat aluminiumprimer on back of wood before fixing				-
11.1	Surfaces no exceeding 100mm girth	M	108		-
11.2	surfaces 200-300mm girth	M	54		-
	prepare and apply three coats gloss oil paint to wood surfaces internally				-
11.3	General surfaces over 100 and not exceeding 200mm girth	M	108		-
11.4	Surfaces 200-300mm girth	M	54		-
11.5	general surfaces of doors	M2	37		-
12	<u>EXTERNAL WALL FINISHES</u>				-
	15mm thick render as described to :				-
12.1	Sides of concrete or stone block surfaces	m ²	65		-
12.2	Doors and Windows reveals not exceeding 100mm girth	m ²	37		-
	prepare and apply one undercoat and two coats approved exterior paint to:				-
12.3	Externally rendered surfaces	m ²	65		-
12.4	Ditto but not exceeding 100mm girth	M	37		-
13	<u>INTERNAL WALL FINISH</u>				-
	20mm thick gauged lime plaster (1:2:9) as described to:				-
13.1	Sides of walls or concrete surfaces	m ²	191		-
13.2	Door and window reveals not exceeding 100mm girth	m ²	77		-
	15mm thick cement sand (1:4) in				-
13.3	Backing to receive eramic wall tiles (measured seperately)	m ²	80		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	Approved ceramic wall tiles as described				
13.4	300x200x6mm thixk tiles on screed backing (m.s) with straight joint	M	80		-
					-
	<u>PAINTING AND DECORATING</u>				-
	prepare and apply three coats plastic emulsion paint to:				-
					-
13.5	Plastered walls	m ²	191		-
					-
13.6	Door and window reveals not exceeding 100mm girth.	M	77		-
					-
14	FLOOR FINISHES				-
	Cement and sand (1:4) screed as described in:				-
					-
14.1	22mm thick backing to receive ceramic floor tiles	m ²	50		-
					-
	300x300x8mm approved non-slip ceramic tiles on screed backing (m.s) with straight joints and pointing in matching cement to floors				-
					-
14.2	paving floors	m ²	50		-
					-
14.3	100mm high skirting	m ²	30		-
					-
	<u>CEILING FINISHES</u>				-
					-
14.4	12.5mm thick chip board ceiling including 100x50mm and 50x50mm bradering at 600mm centers both ways	m ²	50		-
					-
	Wrot cypress				-
					-
14.5	75mm wide cornice	m ²	83		-
					-
	PAINTING AND DECORATING				-
	prepare and apply one undercoat and three finishing coats of interior quality paint as crown solo pure satin emulsion or other equal and approved to				-
	Surfaces of chipboard ceilings	m2	83		-
					-
	prepare and apply three coats of polycurerethane woodseal to boarding,according to manufacturers specifications				-
14.6	Surfaces of wood 0-100mm girth	m ²	50		-
					-
					-
PAGE TOTAL CARRIED TO COLLECTION SHEET(1 No.Ablution block)					-

SIMPLIFIED SEWERS

ITEM No.	DESCRIPTION	Unit	Qty	Rate	Amount (Kshs.)
	Consumer Connection Works will commence during the Construction Period and minimal works can extend to the Defects Liability Period (DLP). The connections will be carried out as soon as the simplified sewers are commissioned. Taking Over will be on completion of the Connections. The Contractor should allow for this in their rates. There will be no extra cost of carrying out the Connection Works during DLP.				
	Typical Arrangement for a Consumer Sewer Connection is shown in the Standard Drawings.				
	It is estimated that the approximate number of consumer sewer connections to be carried out in the Project Area will be instructed The connection works are to be carried out in liason with with the respective Water Service Provider, who will receive, process and approve the applications for connections. The Contractor to obtain from Water Service Provider the exact number of connections and their locations before ordering materials and carrying out any works under this Bill.				
1	CLASS I : PIPEWORK - PIPES				
1.11	Supply of Pipes Excavation, laying and jointing is included in 'B' - Pipe Laying Supply, Transport to Site and Store. The rate to include jointing materials, bolts, gaskets, rubber rings, etc.				
1.12	160mm outside diameter uPVC sewer pipe Class 41	m	2,000		-
1.13	200 mm outside diameter uPVC sewer pipe Class 41	m	4,000		-
1.2	Pipe Laying The rate quoted shall be deemed to include excavation and backfilling with selected excavated material, of pipe trenches. The rates shall also include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority, transport of material from site store to working areas, laying and jointing of pipes and fittings.				
1.21	160mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m	m	2,000		-
1.22	200 mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m	m	4,000		-
Total C/F to Next Page					-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				(KShs.)	
2	CLASS J: FITTINGS AND VALVES				
	Supply, transport to site, transport from site store lay, joint and test, 450 Concrete socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing material, rubber rings etc. The rate should also include mass concrete which will be required for reduction of the Y Junction to the respective service lines.				
2.11	160 mm off 200 mm	Nr	500		-
2.12	160 mm off 160 mm	Nr	350		-
2.13	355mm off 355 mm	Nr	350		-
	Supply, transport to site, transport from site store lay, joint and test, 450 uPVC socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing				
2.14	160mm off 200	Nr	1000		-
2.15	160mm off 315	Nr	350		-
2.16	160mm off 400	Nr	350		-
3	CLASS K - PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES				
	Masonry Inspection Chambers				
3.11	Provide all materials, construct and test sewer inspection chambers of depth not exceeding 1.0m, internal dimensions 450mm x 600mm constructed with 150mm thick masonry walls reinforced with hoop irons at every alternate course as shown on Drawing. Each Chamber is to serve two plots. Include for provision and fixing of light duty rectangular mild steel frame and cover. The cover to be concrete filled as detailed. The rate should be inclusive of two flexible joints adjacent to the Inspection Chamber as detailed and provision	Nr	750		-
	Crossings				
3.12	Allow for crossing existing boundary walls, including reinstatement to original state. Nominal bore not exceeding	Item			
3.13	Allow for crossing existing fences (chain link, barbed wire etc.), including reinstatement to original state. Nominal bore	Item			
Total C/F to Next Page					-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				(KShs.)	
4	CLASS L: PIPEWORK - ANCILLARIES TO LAYING AND EXCAVATION				
	Extras to excavation and backfilling in pipe trenches				
4.11	Excavation in rock (Provisional)	m ³	1,000		-
5	CLASS X: MISCELLANEOUS WORKS				
	Testing of the works				
5.1	Allow for water testing of the sewer conection including sewer pipes and inspection chambers as specified including all requisite Materials, Personnel, Testing Equipment etc. Include provision of all equipment and materials	m	7,500		-
5.2	Allow a Provisional Sum of kshs 5 Million to pilot 10 No. Freshlife Toilets in Mukuru	Prov Sum			5,000,000
	HOUSEHOLD CONNECTION - Water Distributions				
6	<u>PIPE - FITTINGS - SUPPLY AND INSTALL</u>				
	Supply of HDPE pipes in lengths c/w electrofusion Couplers to SSRN 307 PE 100 - Minimum PN 12.5				
	<u>Distribution Pipelines</u>				
	<u>50mm diameter</u>				
6.11	Gatina	m	2,200		-
6.12	Kawamgware	m	400		-
6.13	Other	m	400		-
	<u>63 mm diameter</u>				
6.14	Gatina	m	500		-
6.15	Kawangware	m	1,000		-
	<u>90 mm diameter</u>				
6.16	<u>All</u>	m	500		-
	Supply of GI pipes in 12 m lengths				
	Class B Complete with Sockets Minimum PN 12.5				
	<u>Distribution Pipelines</u>				
	40mm diameter class B GI pipes complete with sockets	m	30		-
	80mm diameter class B GI pipes complete with sockets	m	30		-
	50mm diameter class B GI pipes complete with sockets	m	24		-
7	FITTINGS				
7.11	110mm by 50mm diameter fabricated socketed saddle clamp	no	10		-
7.12	50mm master meter	no	10		-
7.13	50mm short nipple	no	6		-
7.14	32mm Air Valve ARI	no	6		-
7.15	Rubber gasket	m ²	5		-
7.16	50mm diameter gate valve[pegler original]	no	10		-
7.15	50mm valve socket	no	5		-
7.16	50mm diameter GI end cap	no	5		-
7.17	90mm diameter gate valve[pegler original]	no	3		-
7.18	90mm short nipple	no	5		-
7.19	90mm valve socket	no	5		-
7.2	90mm master meter	no	1		-
	Total C/F to Next Page				5,000,000.00

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				(KShs.)	
7.21	90mm diameter GI end cap	no	3		-
7.22	63mm diameter gate valve (pegler original)	no	4		-
7.23	63mm short nipple	no	1		-
7.24	63mm valve socket	no	4		-
7.25	63mm master meter	no	3		-
7.26	63mm diameter GI end cap	no	3		-
7.27	chamber	no	20		-
7.28	Tangit	kg	30		-
8	TESTING				
8.11	Test pressure not exc. 12 bar,	m	5,000		-
9	STERILISATION AND FLUSHING				
9.11	pipe n.b. exc 50 but not exc. 100 mm.	m	5,000		-
Total C/F to Next Page					-
BILL TOTAL CARRIED OVER TO GRAND SUMMARY					5,000,000.00

BILL NO. 2A GATINA AND KAWANGWARE COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE ABLUTION				
1	BROUGHT FORWARD FROM PAGE 1			-	
2	BROUGHT FORWARD FROM PAGE 2			-	
3	BROUGHT FORWARD FROM PAGE 3			-	
4	BROUGHT FORWARD FROM PAGE 4			-	
5	BROUGHT FORWARD FROM PAGE 5			-	
6	BROUGHT FORWARD FROM PAGE 6			-	
7	BROUGHT FORWARD FROM PAGE 7			-	
TOTAL FOR 1 ABLUTION BLOCK.					-
TOTAL FOR 5 No. ABLUTION BLOCKS					-

BILL NO. 2A GATINA AND KAWANGWARE COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE SIMPLIFIED SEWERS, HH AND WATER DISTRIBUTION				
	BROUGHT FORWARD FROM ABOVE			-	
8	BROUGHT FORWARD FROM PAGE 8			-	
9	BROUGHT FORWARD FROM PAGE 9			-	
10	BROUGHT FORWARD FROM PAGE 10			5,000,000	
11	BROUGHT FORWARD FROM PAGE 11			-	
TOTAL CARRIED TO GRAND SUMMARY					5,000,000

BILL NO. 4 MUTHURWA ,GOROFANL,BONDENI,MAJENGO,BLUE ESTATE
ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
1	<u>ELEMENT NO.1</u> <u>SUBSTRUCTURES</u> Excavations				
1.1	Excavate for foundation trenches n.e 1500mm deep from reduced level ditto.	m ³	59		-
1.2	Extra over excavations for excavating in class 1 rock at any depth	m ³	12		-
	Disposal of excavated materials				-
1.3	<u>Return fill and ram selected excavated materials around foundations</u>	m ³	33		-
1.4	<u>Load cart away to a distance not exceeding 100m</u>	m ³	26		-
	Planking & strutting				-
1.5	Allow for planking and strutting	ITEM	1		-
	Disposal of water				-
1.6	Allow for keeping excavation free from all water	ITEM	1		-
	Hardcore Filling				-
1.7	300mm thick fillings,rolled,levelled and compacted in 150mm layers to make up levels	M2	41		-
1.8	50mm stone dust bliding to surface of hardcore	M2	41		-
	Damp Proof Membrane				-
1.9	Single layer of 1000gauge polythene sheeting laid on blinded hardcore with 150mm side laps to receive concrete	M2	54		-
	Anti-termite treatment				-
1.1	Treat surface of hardcore with 'Dieldrin' or similar approved anti-termite solution applied strictly in accordance with the manufacturer's instructions	M2	54		-
	PAGE TOTAL CARRIED TO COLLECTION SHEET				-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
2	<u>Concrete Work</u> Plain concrete class c12/15 achieving characteristics compressive strength of 25n/mm ² <u>at 28 days of 150mm cubes as per BS standard of 15th August,2005 in:</u>				
2.1	50mm bliding to strip foundations	M2	39		-
2.2	Strip foundations	m ³	8		-
2.3	150mm thick surface bed	M2	54		-
	<u>Supply and fix steel bar reinforcement including bending,hooking,tying wire,cutting spacers and supporting all in position</u>				-
	<u>High yield square twisted bar reinforcement to B.S 4661</u>				-
2.4	Assorted	KG	800		-
	<u>Steel Fabric mesh reinforcement to B.S 4483</u>				-
2.5	BRC mesh fabric reinforcement ref. A142 (weighing 2.2kg/m ² laid in ramp (measured net-no allowance made fo laps)	M2	54		-
2.6	Sawn formwork to vertical sides of strip footing	M	26		-
2.7	vertical edges of slab 75-150mm	M	30		-
3	masonry				-
	Natural stone walling bedded in cement and sand mortar as before described				-
3.1	200mmthick walling	M2	82		-
	Cement/sand (1:3)				-
	PAGE TOTAL CARRIED TO COLLECTION SHEET				-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
3.2	12mm thick external rendering to plinth surfaces finished smooth with a wood float	M2	9		-
3.3	prepare and apply two coats of bituminous paint to rendered surfaces externally	M2	9		-
4	R.C.SUPERSTRUCTURE				-
	ALL PROVISIONAL				-
	Vibrated Reinforced concrete class C20/20 achieving characteristics compressive strength of 20N/mm ² at 28days of 150mm cubes as per BS standard of 15th August.2005 in :				-
4.1	Beams	m ³	4		-
	High tensile square twisted to BS 4461 as described in:-				-
4.2	Assorted	KG	480.00		-
4.3	Sawn formwork as described to:- Vertical sides and soffits of beams	M2	39		-
5	EXTERNAL WALLING				-
	Aproved bush hammered "blue stone" walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron in every alternate course				-
5.1	200mm thick walling	M2	29		-
	Fine dressed natural stone walling,bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course.				-
5.2	200mm thick walling	M2	52		-
	PAGE TOTAL CARRIED TO COLLECTION SHEET				-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>labour& Sundries</u>				
5.3	Extra over 200mm thick walling for zero joints	M	29		-
					-
					-
	<u>Approved hessian based damp proof course</u>				-
					-
5.6	200mm wide hessian based bituminous felt damp proofing course laid and bedded on cement sand (1:4)	NO	29		-
6	<u>INTERNAL WALLING</u>				-
					-
	Fine dressed natural stone walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course				-
6.1	200mm thick walling	M2	19		-
6.2	150mm thick walling	m2	76		-
					-
	<u>Approved hessian based damp proof course</u>				-
					-
6.3	200mm wide	m	6		-
6.4	150mm wide	m	30		-
7	<u>ROOF CONTRUCTION & COVERING (PROVISIONAL)</u>				-
	<u>STRUCTURAL STEEL WORK</u>				-
	The Contractor to allow in his rate for gusset plates,brackets,bolts etc to the structure connections				-
					-
7.1	Allowance for steel roof structure comprising RHS top and bottom cords,struts and ties and z purlins all to structural Engineers drawings and details	M2	80		-
	Sheet covering				
	Approved Asphalt shingles laid on steel roof structure and fixed as per manufactures instructions including all recquired accessories as ends,barrels,trims and flashings				
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

<u>ABLUTION BLOCKS</u>					
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
7.2	Roof covering <u>Wrot Cypress</u>	M2	80		- -
7.3	250 x030mm fascia or barge board <u>Eaves Fillings</u>	M	35		- -
7.4	PVC tounge and grooved eaves fillings with mosquito gauge and ventilation opening to approval <u>Rainwater disposal (All provisional)</u> <u>Approved PVC Gutter</u>	M2	21		- -
7.5	U-shaped Pvc gutter fixed to fascia board with approved means	LM	35		-
7.6	100mm Diameter down pipes fixed to wall with brackets at 1200c/c	LM	14		- -
8	<u>EXTRA OVER</u>				- -
8.1	100mm diameter outlets	NO	4		-
8.2	Rainwater swanneck bend	NO	4		-
8.3	Stopped end	NO	4		-
8.4	Rainwater anti-splash shoe PAINTING AND DECORATING Knot,prime and prepare and apply three coats gloss exterior oil paint on wood surfaces to:	NO	4		- -
8.5	General surfaces of wood	M2	20.00		-
9	<u>WINDOWS</u> Mazeras window coping				- -
9.1	Windows cill size 200x25mm once sunk,weathered and throated,with 10mm drip paint to approval	M	11		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>Aluminium Casement Windows</u> Supply,assemble and fix the following Aluminium framed windows,fabricated from approved composite extruded powder coated heavy duty approved stardard hollow sections 100 x 50mm (minimum 2mm thick) including 6mm thick glazing secured on framing with approved with glazing strips and glazing beading including waterproofing all joints using silicon,sealing compounds and approved aluminium brackets;fixing with screws;building in lugs to jams,plugging and screwing head and cill,sealing with mastic,adjusting on completion and all neccessary ironmongery such as hinges,locking devices to architects details and Approval				
9.2	Windows overall size 1620 x 600mm high	NO	6		-
					-
10	<u>DOORS</u>				-
10.1	Supply and fix 50mm thick wrot mahogany panelled door;overall size 900x2100mm high	NO	2		-
					-
	Supply and fix the following 45mm thick(finished) semi solid core flush door faced both sides with interior quality plywood hardwood lipped all round all to archtects details and approval				-
10.2	Door size 900x 2100mm high	NO	2		-
					-
10.3	Door size 800x 2100mm high	NO	6		-
	Ironmongery Supply and fix the following ironmongery complete with matching screws all as per "union" catalogue or other aqual and approved				
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
10.4	3-lever mortice door lock	NO	2		-
10.5	2-lever mortice door lock	NO	8		-
10.6	100mm heavy duty steel butt hinges	NO	15		-
10.7	Approved rubber door stop	NO	10		-
	<u>FRAMES AND FINISHINGS</u>				-
10.8	150x50mm frame with three labours,plugged	M	54		-
10.9	50x20mm rounded architrave with two labours	M	54		-
10.10	20mm diameter quadrant beading ditto.	M	54		-
11	<u>PAINTING AND DECORATING</u> prepare and apply one coat aluminium primer on back of wood before fixing				-
11.1	Surfaces no exceeding 100mm girth	M	108		-
11.2	surfaces 200-300mm girth prepare and apply three coats gloss oil paint to wood surfaces internally	M	54		-
11.3	General surfaces over 100 and not exceeding 200mm girth	M	108		-
11.4	Surfaces 200-300mm girth	M	54		-
11.5	general surfaces of doors	M2	37		-
12	<u>EXTERNAL WALL FINISHES</u> 15mm thick render as described to :				-
12.1	Sides of concrete or stone block surfaces	M2	65		-
12.2	Doors and Windows reveals not exceeding 100mm girth prepare and apply one undercoat and two coats approved exterior paint to:	M2	37		-
12.3	Externally rendered surfaces	M2	65		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
12.4	Ditto but not exceeding 100mm girth	M	37		-
13	<u>INTERNAL WALL FINISH</u> 20mm thick gauged lime plaster (1:2:9) as described to:				-
13.1	Sides of walls or concrete surfaces	M2	191		-
13.2	Door and window reveals not exceeding 100mm girth	M2	77		-
	15mm thick cement sand (1:4) in				-
13.3	Backing to receive eramic wall tiles (measured seperately)	M2	80		-
	Approved ceramic wall tiles as described				-
13.4	300x200x6mm thixk tiles on screed backing (m.s) with st	M	80		-
	<u>PAINTING AND DECORATING</u> prepare and apply three coats plastic emulsion paint to:				-
13.5	Plastered walls	M2	191		-
13.6	Door and window reveals not exceeding 100mm girth.	M	77		-
14	FLOOR FINISHES Cement and sand (1:4) screed as described in:				-
14.1	22mm thick backing to receive ceramic floor tiles	M2	50		-
	300x300x8mm approved non-slip ceramic tiles on screed backing (m.s) with straight joints and pointing in matching cement to floors				-
14.2	paving floors	M2	50		-
14.3	100mm high skirting	M2	30		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>CEILING FINISHES</u>				
14.4	12.5mm thick chip board ceiling including 100x50mm and 50x50mm bradering at 600mm centers both ways	M2	50		-
14.5	Wrot cypress				-
	75mm wide cornice	M2	83		-
	PAINTING AND DECORATING				-
	prepare and apply one undercoat and three finishing coats of interior quality paint as crown solo pure satin emulsion or other equal and approved to				-
	Surfaces of chipboard ceilings	m2	83		-
	prepare and apply three coats of polycurerethane woodseal to boarding,according to manufacturers specifications				-
14.6	Surfaces of wood 0-100mm girth	M2	50		-
					-
BILL TOTAL CARRIED TO COLLECTION PAGE					-

COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE ABLUTION				
1	BROUGHT FORWARD FROM PAGE 1			-	
2	BROUGHT FORWARD FROM PAGE 2			-	
3	BROUGHT FORWARD FROM PAGE 3			-	
4	BROUGHT FORWARD FROM PAGE 4			-	
5	BROUGHT FORWARD FROM PAGE 5			-	
6	BROUGHT FORWARD FROM PAGE 6			-	
7	BROUGHT FORWARD FROM PAGE 7			-	
8	BROUGHT FORWARD FROM PAGE 8			-	
9	BROUGHT FORWARD FROM PAGE 9			-	
TOTAL FOR 1 ABLUTION BLOCK.					-
TOTAL FOR 5 No. ABLUTION BLOCKS					-

BILL NO. 5 LINDI,SARANGOMBE
ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
1	<u>ELEMENT NO.1</u> <u>SUBSTRUCTURES</u> Excavations				
1.1	Excavate for foundation trenches n.e 1500mm deep from reduced level ditto.	m ³	59		-
1.2	Extra over excavations for excavating in class 1 rock at any depth	m ³	12		-
	Disposal of excavated materials				-
1.3	<u>Return fill and ram selected excavated materials around foundations</u>	m ³	33		-
1.4	<u>Load cart away to a distance not exceeding 100m</u>	m ³	26		-
	Planking & strutting				-
1.5	Allow for planking and strutting	ITEM	1		-
	Disposal of water				-
1.6	Allow for keeping excavation free from all water	ITEM	1		-
	Hardcore Filling				-
1.7	300mm thick fillings,rolled,levelled and compacted in 150mm layers to make up levels	M2	41		-
1.8	50mm stone dust bliding to surface of hardcore	M2	41		-
	Damp Proof Membrane				-
1.9	Single layer of 1000gauge polythene sheeting laid on blinded hardcore with 150mm side laps to receive concrete	M2	54		-
	Anti-termite treatment				-
1.1	Treat surface of hardcore with 'Dieldrin' or similar approved anti-termite solution applied strictly in accordance with the manufacturer's instructions	M2	54		-
	PAGE TOTAL CARRIED TO COLLECTION SHEET				-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
2	<u>Concrete Work</u> Plain concrete class c12/15 achieving characteristics compressive strength of 25n/mm ² <u>at 28 days of 150mm cubes as per BS standard of 15th August,2005 in:</u>				
2.1	50mm bliding to strip foundations	M2	39		-
2.2	Strip foundations	m ³	8		-
2.3	150mm thick surface bed	M2	54		-
	<u>Supply and fix steel bar reinforcement including bending,hooking,tying wire,cutting spacers and supporting all in position</u>				-
	<u>High yield square twisted bar reinforcement to B.S 4661</u>				-
2.4	Assorted	KG	800		-
	<u>Steel Fabric mesh reinforcement to B.S 4483</u>				-
2.5	BRC mesh fabric reinforcement ref. A142 (weighing 2.2kg/m ² laid in ramp (measured net-no allowance made fo laps)	M2	54		-
2.6	Sawn formwork to vertical sides of strip footing	M	26		-
2.7	vertical edges of slab 75-150mm	M	30		-
3	masonry				-
	Natural stone walling bedded in cement and sand mortar as before described				-
3.1	200mmthick walling	M2	82		-
	Cement/sand (1:3)				-
	PAGE TOTAL CARRIED TO COLLECTION SHEET				-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
3.2	12mm thick external rendering to plinth surfaces finished smooth with a wood float	M2	9		-
3.3	prepare and apply two coats of bituminous paint to rendered surfaces externally	M2	9		-
4	R.C.SUPERSTRUCTURE				-
	ALL PROVISIONAL				-
	Vibrated Reinforced concrete class C20/20 achieving characteristics compressive strength of 20N/mm² at 28days of 150mm cubes as per BS standard of 15th August.2005 in :				-
4.1	Beams	m³	4		-
	High tensile square twisted to BS 4461 as described in:-				-
4.2	Assorted	KG	480.00		-
4.3	Sawn formwork as described to:- Vertical sides and soffits of beams	M2	39		-
5	EXTERNAL WALLING				-
	Aproved bush hammered "blue stone" walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron in every alternate course				-
5.1	200mm thick walling	M2	29		-
	Fine dressed natural stone walling,bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course.				-
5.2	200mm thick walling	M2	52		-
	PAGE TOTAL CARRIED TO COLLECTION SHEET				-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>labour& Sundries</u>				
5.3	Extra over 200mm thick walling for zero joints	M	29		-
					-
					-
	<u>Approved hessian based damp proof course</u>				-
					-
5.6	200mm wide hessian based bituminous felt damp proofing course laid and bedded on cement sand (1:4)	NO	29		-
6	<u>INTERNAL WALLING</u>				-
					-
	Fine dressed natural stone walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course				-
6.1	200mm thick walling	M2	19		-
6.2	150mm thick walling	m2	76		-
					-
	<u>Approved hessian based damp proof course</u>				-
					-
6.3	200mm wide	m	6		-
6.4	150mm wide	m	30		-
7	<u>ROOF CONTRUCTION & COVERING (PROVISIONAL)</u>				-
	<u>STRUCTURAL STEEL WORK</u>				-
	The Contractor to allow in his rate for gusset plates,brackets,bolts etc to the structure connections				-
					-
7.1	Allowance for steel roof structure comprising RHS top and bottom cords,struts and ties and z purlins all to structural Engineers drawings and details	M2	80		-
	Sheet covering				
	Approved Asphalt shingles laid on steel roof structure and fixed as per manufactures instructions including all recquired accessories as ends,barrels,trims and flashings				
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

<u>ABLUTION BLOCKS</u>					
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
7.2	Roof covering <u>Wrot Cypress</u>	M2	80		- -
7.3	250 x030mm fascia or barge board <u>Eaves Fillings</u>	M	35		- -
7.4	PVC tounge and grooved eaves fillings with mosquito gauge and ventilation opening to approval <u>Rainwater disposal (All provisional)</u> <u>Approved PVC Gutter</u>	M2	21		- -
7.5	U-shaped Pvc gutter fixed to fascia board with approved means	LM	35		-
7.6	100mm Diameter down pipes fixed to wall with brackets at 1200c/c	LM	14		- -
8	<u>EXTRA OVER</u>				- -
8.1	100mm diameter outlets	NO	4		-
8.2	Rainwater swanneck bend	NO	4		-
8.3	Stopped end	NO	4		-
8.4	Rainwater anti-splash shoe PAINTING AND DECORATING Knot,prime and prepare and apply three coats gloss exterior oil paint on wood surfaces to:	NO	4		- -
8.5	General surfaces of wood	M2	20.00		- -
9	<u>WINDOWS</u> Mazeras window coping				- -
9.1	Windows cill size 200x25mm once sunk,weathered and throated,with 10mm drip paint to approval	M	11		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>Aluminium Casement Windows</u> Supply,assemble and fix the following Aluminium framed windows,fabricated from approved composite extruded powder coated heavy duty approved stardard hollow sections 100 x 50mm (minimum 2mm thick) including 6mm thick glazing secured on framing with approved with glazing strips and glazing beading including waterproofing all joints using silicon,sealing compounds and approved aluminium brackets;fixing with screws;building in lugs to jams,plugging and screwing head and cill,sealing with mastic,adjusting on completion and all neccessary ironmongery such as hinges,locking devices to architects details and Approval				
9.2	Windows overall size 1620 x 600mm high	NO	6		-
					-
10	<u>DOORS</u>				-
10.1	Supply and fix 50mm thick wrot mahogany panelled door;overall size 900x2100mm high	NO	2		-
					-
	Supply and fix the following 45mm thick(finished) semi solid core flush door faced both sides with interior quality plywood hardwood lipped all round all to archtects details and approval				-
10.2	Door size 900x 2100mm high	NO	2		-
					-
10.3	Door size 800x 2100mm high	NO	6		-
	Ironmongery Supply and fix the following ironmongery complete with matching screws all as per "union" catalogue or other aqual and approved				
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
10.4	3-lever mortice door lock	NO	2		-
10.5	2-lever mortice door lock	NO	8		-
10.6	100mm heavy duty steel butt hinges	NO	15		-
10.7	Approved rubber door stop	NO	10		-
	<u>FRAMES AND FINISHINGS</u>				-
10.8	150x50mm frame with three labours,plugged	M	54		-
10.9	50x20mm rounded architrave with two labours	M	54		-
10.10	20mm diameter quadrant beading ditto.	M	54		-
11	<u>PAINTING AND DECORATING</u> prepare and apply one coat aluminium primer on back of wood before fixing				-
11.1	Surfaces no exceeding 100mm girth	M	108		-
11.2	surfaces 200-300mm girth prepare and apply three coats gloss oil paint to wood surfaces internally	M	54		-
11.3	General surfaces over 100 and not exceeding 200mm girth	M	108		-
11.4	Surfaces 200-300mm girth	M	54		-
11.5	general surfaces of doors	M2	37		-
12	<u>EXTERNAL WALL FINISHES</u> 15mm thick render as described to :				-
12.1	Sides of concrete or stone block surfaces	M2	65		-
12.2	Doors and Windows reveals not exceeding 100mm girth prepare and apply one undercoat and two coats approved exterior paint to:	M2	37		-
12.3	Externally rendered surfaces	M2	65		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
12.4	Ditto but not exceeding 100mm girth	M	37		-
13	<u>INTERNAL WALL FINISH</u> 20mm thick gauged lime plaster (1:2:9) as described to:				-
13.1	Sides of walls or concrete surfaces	M2	191		-
13.2	Door and window reveals not exceeding 100mm girth	M2	77		-
	15mm thick cement sand (1:4) in				-
13.3	Backing to receive eramic wall tiles (measured seperately)	M2	80		-
	Approved ceramic wall tiles as described				-
13.4	300x200x6mm thixk tiles on screed backing (m.s) with st	M	80		-
	<u>PAINTING AND DECORATING</u> prepare and apply three coats plastic emulsion paint to:				-
13.5	Plastered walls	M2	191		-
13.6	Door and window reveals not exceeding 100mm girth.	M	77		-
14	FLOOR FINISHES Cement and sand (1:4) screed as described in:				-
14.1	22mm thick backing to receive ceramic floor tiles	M2	50		-
	300x300x8mm approved non-slip ceramic tiles on screed backing (m.s) with straight joints and pointing in matching cement to floors				-
14.2	paving floors	M2	50		-
14.3	100mm high skirting	M2	30		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>CEILING FINISHES</u>				
14.4	12.5mm thick chip board ceiling including 100x50mm and 50x50mm bradering at 600mm centers both ways	M2	50		-
14.5	Wrot cypress 75mm wide cornice	M2	83		-
	PAINTING AND DECORATING prepare and apply one undercoat and three finishing coats of interior quality paint as crown solo pure satin emulsion or other equal and approved to				-
	Surfaces of chipboard ceilings	m2	83		-
	prepare and apply three coats of polycurerethane woodseal to boarding,according to manufacturers specifications				-
14.6	Surfaces of wood 0-100mm girth	M2	50		-
					-
BILL TOTAL CARRIED TO COLLECTION PAGE					-

COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE ABLUTION				
1	BROUGHT FORWARD FROM PAGE 1			-	
2	BROUGHT FORWARD FROM PAGE 2			-	
3	BROUGHT FORWARD FROM PAGE 3			-	
4	BROUGHT FORWARD FROM PAGE 4			-	
5	BROUGHT FORWARD FROM PAGE 5			-	
6	BROUGHT FORWARD FROM PAGE 6			-	
7	BROUGHT FORWARD FROM PAGE 7			-	
8	BROUGHT FORWARD FROM PAGE 8			-	
9	BROUGHT FORWARD FROM PAGE 9			-	
TOTAL FOR 1 ABLUTION BLOCK.					-
TOTAL FOR 4 No. ABLUTION BLOCKS					-

**BILL NO.6 KIAMBIU
ABLUTION BLOCKS**

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
1	<u>ELEMENT NO.1</u> <u>SUBSTRUCTURES</u>				
	Excavations				
1.1	Excavate for foundation trenches n.e 1500mm deep from reduced level ditto.	m ³	59		-
1.2	Extra over excavations for excavating in class 1 rock at any depth	m ³	12		-
	Disposal of excavated materials				
1.3	<u>Return fill and ram selected excavated materials around foundations</u>	m ³	33		-
1.4	<u>Load cart away to a distance not exceeding 100m</u>	m ³	26		-
	Planking & strutting				
1.5	Allow for planking and strutting	ITEM	1		-
	Disposal of water				
1.6	Allow for keeping excavation free from all water	ITEM	1		-
	Hardcore Filling				
1.7	300mm thick fillings,rolled,levelled and compacted in 150mm layers to make up levels	M2	41		-
1.8	50mm stone dust bliding to surface of hardcore	M2	41		-
	Damp Proof Membrane				
1.9	Single layer of 1000gauge polythene sheeting laid on blinded hardcore with 150mm side laps to receive concrete	M2	54		-
	Anti-termite treatment				
1.1	Treat surface of hardcore with 'Dieldrin' or similar approved anti-termite solution applied strictly in accordance with the manufacturer's instructions	M2	54		-
2	<u>Concrete Work</u>				
	Plain concrete class c12/15 achieving characteristics compressive strength of 25n/mm ² <u>at 28 days of 150mm cubes as per BS stardard of 15th August,2005 in:</u>				
2.1	50mm bliding to strip foundations	M2	39		-
2.2	Strip foundations	m ³	8		-
2.3	150mm thick surface bed	M2	54		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					
					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>Supply and fix steel bar reinforcement including bending, hooking, tying wire, cutting spacers and supporting all in position</u>				
2.4	High yield square twisted bar reinforcement to B.S 4661 Assorted	KG	800		-
2.5	<u>Steel Fabric mesh reinforcement to B.S 4483</u> BRC mesh fabric reinforcement ref. A142 (weighing 2.2kg/m² laid in ramp (measured net-no allowance made for laps)	M2	54		-
2.6	Sawn formwork to vertical sides of strip footing	M	26		-
2.7	vertical edges of slab 75-150mm	M	30		-
3	masonry Natural stone walling bedded in cement and sand mortar as before described				
3.1	200mm thick walling Cement/sand (1:3)	M2	82		-
3.2	12mm thick external rendering to plinth surfaces finished smooth with a wood float	M2	9		-
3.3	prepare and apply two coats of bituminous paint to rendered surfaces externally	M2	9		-
4	R.C.SUPERSTRUCTURE ALL PROVISIONAL Vibrated Reinforced concrete class C20/20 achieving characteristics compressive strength of 20N/mm² at 28days of 150mm cubes as per BS standard of 15th August.2005 in :				
4.1	Beams High tensile square twisted to BS 4461 as described in:-	m³	4		-
4.2	Assorted	KG	480.00		-
4.3	Sawn formwork as described to:- Vertical sides and soffits of beams	M2	39		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

<u>ABLUTION BLOCKS</u>					
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
5	EXTERNAL WALLING Aproved bush hammered "blue stone" walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron in every alternate course				
5.1	200mm thick walling	m ²	29	-	-
	Fine dressed natural stone walling,bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course.			-	-
5.2	200mm thick walling	m ²	52	-	-
	<u>labour& Sundries</u>			-	-
5.3	Extra over 200mm thick walling for zero joints	M	29	-	-
	<u>Approved hessian based damp proof course</u>			-	-
5.6	200mm wide hessian based bituminous felt damp proofing course laid and bedded on cement sand (1:4)	NO	29	-	-
6	<u>INTERNAL WALLING</u>			-	-
	Fine dressed natural stone walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course			-	-
6.1	200mm thick walling	m ²	19	-	-
6.2	150mm thick walling	m ²	76	-	-
	<u>Approved hessian based damp proof course</u>			-	-
6.3	200mm wide	m	6	-	-
6.4	150mm wide	m	30	-	-
	PAGE TOTAL CARRIED TO COLLECTION SHEET			-	-

PAGE TOTAL CARRIED TO COLLECTION SHEET

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
7	<u>ROOF CONTRUCTION & COVERING (PROVISIONAL)</u>				
	<u>STRUCTURAL STEEL WORK</u>				
	The Contractor to allow in his rate for gusset plates,brackets,bolts etc to the structure connections				
7.1	Allowance for steel roof structure comprising RHS top and bottom cords,struts and ties and z purlins all to structural Engineers drawings and details	m ²	80		-
	Sheet covering				
	Approved Asphalt shingles laid on steel roof structure and fixed as per manufactures instructions including all recquired accessories as ends,barrels,trims and flashings				-
7.2	Roof covering	m ²	80		-
	<u>Wrot Cypress</u>				-
7.3	250 x030mm fascia or barge board	M	35		-
	<u>Eaves Fillings</u>				-
7.4	PVC tounge and grooved eaves fillings with mosquito gauge and ventilation opening to approval	m ²	21		-
	<u>Rainwater disposal (All provisional)</u>				-
	<u>Approved PVC Gutter</u>				-
7.5	U-shaped Pvc gutter fixed to fascia board with approved means	LM	35		-
7.6	100mm Diameter down pipes fixed to wall with brackets at 1200c/c	LM	14		-
8	<u>EXTRA OVER</u>				-
8.1	100mm diameter outlets	NO	4		-
8.2	Rainwater swanneck bend	NO	4		-
8.3	Stopped end	NO	4		-
8.4	Rainwater anti-splash shoe	NO	4		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	PAINTING AND DECORATING				
	Knot,prime and prepare and apply three coats gloss exterior oil paint on wood surfaces to:				
8.5	General surfaces of wood	m ²	20.00		-
					-
9	<u>WINDOWS</u>				-
	Mazeras window coping				-
					-
9.1	Windows cill size 200x25mm once sunk,weathered and throated,with 10mm drip paint to approval	M	11		-
					-
	<u>Aluminium Casement Windows</u>				-
	Supply,assemble and fix the following Aluminium framed windows,fabricated from approved composite extruded powder coated heavy duty approved stardard hollow sections 100 x 50mm (minimum 2mm thick) including 6mm thick glazing secured on framing with approved with glazing strips and glazing beading including waterproofing all joints using silicon,sealing compounds and approved aluminium brackets;fixing with screws;building in lugs to jams,plugging and screwing head and cill,sealing with mastic,adjusting on completion and all neccessary ironmongery such as hinges,locking devices to architects details and Approval				-
					-
9.2	Windows overall size 1620 x 600mm high	NO	6		-
					-
10	<u>DOORS</u>				-
10.1	Supply and fix 50mm thick wrot mahogany panelled door;overall size 900x2100mm high	NO	2		-
					-
	Supply and fix the following 45mm thick(finished) semi solid core flush door faced both sides with interior quality plywood hardwood lipped all round all to archtects details and approval				-
10.2	Door size 900x 2100mm high	NO	2		-
					-
10.3	Door size 800x 2100mm high	NO	6		-
	Ironmongery				-
	Supply and fix the following ironmongery complete with matching screws all as per "union" catalogue or other aqual and approved				-
					-
10.4	3-lever mortice door lock	NO	2		-
					-
10.5	2-lever mortice door lock	NO	8		-
					-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
10.6	100mm heavy duty steel butt hinges	NO	15		-
10.7	Aproved rubber door stop	NO	10		-
	<u>FRAMES AND FINISHINGS</u>				-
10.8	150x50mm frame with three labours,plugged	M	54		-
10.9	50x20mm rounded architrave with two labours	M	54		-
10.10	20mm diameter quadrant beading ditto.	M	54		-
11	<u>PAINTING AND DECORATING</u>				-
	prepare and apply one coat aluminiumprimer on back of wood before fixing				-
11.1	Surfaces no exceeding 100mm girth	M	108		-
11.2	surfaces 200-300mm girth	M	54		-
	prepare and apply three coats gloss oil paint to wood surfaces internally				-
11.3	General surfaces over 100 and not exceeding 200mm girth	M	108		-
11.4	Surfaces 200-300mm girth	M	54		-
11.5	general surfaces of doors	M2	37		-
12	<u>EXTERNAL WALL FINISHES</u>				-
	15mm thick render as described to :				-
12.1	Sides of concrete or stone block surfaces	m ²	65		-
12.2	Doors and Windows reveals not exceeding 100mm girth	m ²	37		-
	prepare and apply one undercoat and two coats approved exterior paint to:				-
12.3	Externally rendered surfaces	m ²	65		-
12.4	Ditto but not exceeding 100mm girth	M	37		-
13	<u>INTERNAL WALL FINISH</u>				-
	20mm thick gauged lime plaster (1:2:9) as described to:				-
13.1	Sides of walls or concrete surfaces	m ²	191		-
13.2	Door and window reveals not exceeding 100mm girth	m ²	77		-
	15mm thick cement sand (1:4) in				-
13.3	Backing to receive eramic wall tiles (measured seperately)	m ²	80		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
13.4	Approved ceramic wall tiles as described 300x200x6mm thix tiles on screed backing (m.s) with straight joint				
		M	80		-
					-
	<u>PAINTING AND DECORATING</u> prepare and apply three coats plastic emulsion paint to:				-
					-
					-
					-
13.5	Plastered walls	m ²	191		-
13.6	Door and window reveals not exceeding 100mm girth.				-
		M	77		-
14 FLOOR FINISHES	Cement and sand (1:4) screed as described in:				-
					-
					-
					-
14.1	22mm thick backing to receive ceramic floor tiles	m ²	50		-
	300x300x8mm approved non-slip ceramic tiles on screed backing (m.s) with straight joints and pointing in matching cement to floors				-
					-
					-
					-
14.2	paving floors	m ²	50		-
14.3	100mm high skirting				-
		m ²	30		-
<u>CEILING FINISHES</u>					-
					-
					-
					-
14.4	12.5mm thick chip board ceiling including 100x50mm and 50x50mm bradering at 600mm centers both ways	m ²	50		-
	Wrot cypress				-
					-
					-
					-
14.5	75mm wide cornice	m ²	83		-
PAINTING AND DECORATING	prepare and apply one undercoat and three finishing coats of interior quality paint as crown solo pure satin emulsion or other equal and approved to				-
					-
					-
					-
	Surfaces of chipboard ceilings				-
		m2	83		-
					-
					-
	prepare and apply three coats of polycurerethane woodseal to boarding,according to manufacturers specifications				-
					-
					-
					-
14.6	Surfaces of wood 0-100mm girth	m ²	50		-
					-
					-
					-
					-
	PAGE TOTAL CARRIED TO COLLECTION SHEET(1 No.Ablution block)				-
					-
					-
					-

SIMPLIFIED SEWERS					
ITEM No.	DESCRIPTION	Unit	Qty	Rate	Amount (Kshs.)
1	<p>Consumer Connection Works will commence during the Construction Period and minimal works can extend to the Defects Liability Period (DLP). The connections will be carried out as soon as the simplified sewers are commissioned. Taking Over will be on completion of the Connections. The Contractor should allow for this in their rates. There will be no extra cost of carrying out the Connection Works during DLP.</p> <p>Typical Arrangement for a Consumer Sewer Connection is shown in the Standard Drawings.</p> <p>It is estimated that the approximate number of consumer sewer connections to be carried out in the Project Area is 200. The connection works are to be carried out in liason with with the respective Water Service Provider, who will receive, process and approve the applications for connections.</p> <p>The Contractor to obtain from Water Service Provider the exact number of connections and their locations before ordering materials and carrying out any works under this Bill.</p> <p>CLASS I : PIPEWORK - PIPES</p> <p>1.11 Supply of Pipes Excavation, laying and jointing is included in 'B' - Pipe Laying Supply, Transport to Site and Store. The rate to include jointing materials, bolts, gaskets, rubber rings, etc.</p> <p>1.12 160mm outside diameter uPVC sewer pipe Class 41</p> <p>1.13 200 mm outside diameter uPVC sewer pipe Class 41</p> <p>1.2 Pipe Laying The rate quoted shall be deemed to include excavation and backfilling with selected excavated material, of pipe trenches. The rates shall also include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority, transport of material from site store to working areas, laying and jointing of pipes and fittings.</p> <p>1.21 160mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m</p> <p>1.22 200 mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m</p>				
Total C/F to Next Page					-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				(KShs.)	
2	CLASS J: FITTINGS AND VALVES				
	Supply, transport to site, transport from site store lay, joint and test, 450 Concrete socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing material, rubber rings etc. The rate should also include mass concrete which will be required for reduction of the Y Junction to the respective service lines.				
2.11	160 mm off 200 mm	Nr	100		-
2.12		Nr	350		-
2.13	355mm off 355	Nr	350		-
	Supply, transport to site, transport from site store lay, joint and test, 450 uPVC socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing				
2.14	160mm off 200	Nr	1000		-
2.15	160mm off 315	Nr	300		-
2.16	160mm off 400	Nr	300		-
3	CLASS K - PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES				
	Masonry Inspection Chambers				
3.11	Provide all materials, construct and test sewer inspection chambers of depth not exceeding 1.0m, internal dimensions 450mm x 600mm constructed with 150mm thick masonry walls reinforced with hoop irons at every alternate course as shown on Drawing. Each Chamber is to serve two plots. Include for provision and fixing of light duty rectangular mild steel frame and cover. The cover to be concrete filled as detailed. The rate should be inclusive of two flexible joints adjacent to the Inspection Chamber as detailed and provision	Nr	500		-
	Crossings				
3.12	Allow for crossing existing boundary walls, including reinstatement to original state. Nominal bore not exceeding	Item			
3.13	Allow for crossing existing fences (chain link, barbed wire etc.), including reinstatement to original state. Nominal bore	Item			
Total C/F to Next Page					

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (KShs.)	AMOUNT
4	CLASS L: PIPEWORK - ANCILLARIES TO LAYING AND EXCAVATION				
	Extras to excavation and backfilling in pipe trenches				
4.11	Excavation in rock (Provisional)	m ³	1,000		-
5	CLASS X: MISCELLANEOUS WORKS				
	Testing of the works				
5.1	Allow for water testing of the sewer conection including sewer pipes and inspection chambers as specified including all requisite Materials, Personnel, Testing Equipment etc. Include provision of all equipment and materials	m	4,000		-
	HOUSEHOLDCONNECTION - Water Distributions				
6	<u>PIPE - FITTINGS - SUPPLY AND INSTALL</u>				
	Supply of HDPE pipes in lengths c/w electrofusion Couplers to SSRN 307 PE 100 - Minimum PN 12.5				
	<u>Distribution Pipelines</u>				
	<u>50mm diameter</u>				
6.11	Gatina	m	2,500		-
6.12	Kawamgware	m	500		-
6.13	Other	m	500		-
	<u>63 mm diameter</u>				
6.14	Gatina	m	500		-
6.15	Kawangware	m	1,000		-
	<u>90 mm diameter</u>				
6.16	<u>All</u>	m	500		-
	Supply of GI pipes in 12 m lengths				
	Class B Complete with Sockets Minimum PN 12.5				
	<u>Distribution Pipelines</u>				
	40mm diameter class B GI pipes complete with sockets	m	30		-
	80mm diameter class B GI pipes complete with sockets	m	30		-
	50mm diameter class B GI pipes complete with sockets	m	24		-
7	FITTINGS				
7.11	110mm by 50mm diameter fabricated socketed saddle clamp	no	10		-
7.12	50mm master meter	no	10		-
7.13	50mm short nipple	no	6		-
7.14	32mm Air Valve ARI	no	6		-
7.15	Rubber gasket	m ²	5		-
7.16	50mm diameter gate valve[pegler original]	no	10		-
7.15	50mm valve socket	no	5		-
7.16	50mm diameter GI end cap	no	5		-
7.17	90mm diameter gate valve[pegler original]	no	3		-
7.18	90mm short nipple	no	5		-
7.19	90mm valve socket	no	5		-
7.2	90mm master meter	no	1		-
	Total C/F to Next Page				-

[illegible]

COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE ABLUTION				
1	BROUGHT FORWARD FROM PAGE 1			-	
2	BROUGHT FORWARD FROM PAGE 2			-	
3	BROUGHT FORWARD FROM PAGE 3			-	
4	BROUGHT FORWARD FROM PAGE 4			-	
5	BROUGHT FORWARD FROM PAGE 5			-	
6	BROUGHT FORWARD FROM PAGE 6			-	
7	BROUGHT FORWARD FROM PAGE 7			-	
TOTAL FOR 1 ABLUTION BLOCK.					-
TOTAL FOR 2 No. ABLUTION BLOCKS					-

BILL NO. 2A GATINA AND KAWANGWARE COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE SIMPLIFIED SEWERS, HH AND WATER DISTRIBUTION				
	BROUGHT FORWARD FROM ABOVE			-	
8	BROUGHT FORWARD FROM PAGE 8			-	
9	BROUGHT FORWARD FROM PAGE 9			-	
10	BROUGHT FORWARD FROM PAGE 10			-	
11	BROUGHT FORWARD FROM PAGE 11			-	
TOTAL CARRIED TO GRAND SUMMARY					-

BILL NO.7 MATHARE 4A, MATHARE, MLANGO KUBWA
ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
1	<u>ELEMENT NO.1</u> <u>SUBSTRUCTURES</u>				
	Excavations				
1.1	Excavate for foundation trenches n.e 1500mm deep from reduced level ditto.	m ³	59		-
1.2	Extra over excavations for excavating in class 1 rock at any depth	m ³	12		-
	Disposal of excavated materials				
1.3	<u>Return fill and ram selected excavated materials around foundations</u>	m ³	33		-
1.4	<u>Load cart away to a distance not exceeding 100m</u>	m ³	26		-
	Planking & strutting				
1.5	Allow for planking and strutting	ITEM	1		-
	Disposal of water				
1.6	Allow for keeping excavation free from all water	ITEM	1		-
	Hardcore Filling				
1.7	300mm thick fillings,rolled,levelled and compacted in 150mm layers to make up levels	M2	41		-
1.8	50mm stone dust bliding to surface of hardcore	M2	41		-
	Damp Proof Membrane				
1.9	Single layer of 1000gauge polythene sheeting laid on blinded hardcore with 150mm side laps to receive concrete	M2	54		-
	Anti-termite treatment				
1.1	Treat surface of hardcore with 'Dieldrin' or similar approved anti-termite solution applied strictly in accordance with the manufacturer's instructions	M2	54		-
2	<u>Concrete Work</u> Plain concrete class c12/15 achieving characteristics compressive strength of 25n/mm ² <u>at 28 days of 150mm cubes as per BS stardard of 15th August,2005 in:</u>				
2.1	50mm bliding to strip foundations	M2	39		-
2.2	Strip foundations	m ³	8		-
2.3	150mm thick surface bed	M2	54		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					
					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>Supply and fix steel bar reinforcement including bending, hooking, tying wire, cutting spacers and supporting all in position</u>				
2.4	High yield square twisted bar reinforcement to B.S 4661 Assorted	KG	800		-
2.5	<u>Steel Fabric mesh reinforcement to B.S 4483</u> BRC mesh fabric reinforcement ref. A142 (weighing 2.2kg/m² laid in ramp (measured net-no allowance made for laps)	M2	54		-
2.6	Sawn formwork to vertical sides of strip footing	M	26		-
2.7	vertical edges of slab 75-150mm	M	30		-
3	masonry Natural stone walling bedded in cement and sand mortar as before described				
3.1	200mm thick walling Cement/sand (1:3)	M2	82		-
3.2	12mm thick external rendering to plinth surfaces finished smooth with a wood float	M2	9		-
3.3	prepare and apply two coats of bituminous paint to rendered surfaces externally	M2	9		-
4	R.C.SUPERSTRUCTURE ALL PROVISIONAL Vibrated Reinforced concrete class C20/20 achieving characteristics compressive strength of 20N/mm² at 28days of 150mm cubes as per BS standard of 15th August.2005 in :				
4.1	Beams High tensile square twisted to BS 4461 as described in:-	m³	4		-
4.2	Assorted	KG	480.00		-
4.3	Sawn formwork as described to:- Vertical sides and soffits of beams	M2	39		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

<u>ABLUTION BLOCKS</u>					
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
5	EXTERNAL WALLING Aproved bush hammered "blue stone" walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron in every alternate course				
5.1	200mm thick walling	m ²	29	-	-
	Fine dressed natural stone walling,bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course.			-	-
5.2	200mm thick walling	m ²	52	-	-
	<u>labour& Sundries</u>			-	-
				-	-
5.3	Extra over 200mm thick walling for zero joints	M	29	-	-
				-	-
	<u>Approved hessian based damp proof course</u>			-	-
				-	-
5.6	200mm wide hessian based bituminous felt damp proofing course laid and bedded on cement sand (1:4)	NO	29	-	-
6	<u>INTERNAL WALLING</u>			-	-
	Fine dressed natural stone walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course			-	-
6.1	200mm thick walling	m ²	19	-	-
6.2	150mm thick walling	m ²	76	-	-
	<u>Approved hessian based damp proof course</u>			-	-
				-	-
6.3	200mm wide	m	6	-	-
				-	-
6.4	150mm wide	m	30	-	-
				-	-
				-	-
				-	-
				-	-
				-	-
				-	-
				-	-
				-	-
				-	-
				-	-
PAGE TOTAL CARRIED TO COLLECTION SHEET				-	-

PAGE TOTAL CARRIED TO COLLECTION SHEET

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
7	<u>ROOF CONTRUCTION & COVERING (PROVISIONAL)</u>				
	<u>STRUCTURAL STEEL WORK</u>				
	The Contractor to allow in his rate for gusset plates,brackets,bolts etc to the structure connections				
7.1	Allowance for steel roof structure comprising RHS top and bottom cords,struts and ties and z purlins all to structural Engineers drawings and details	m ²	80		-
	Sheet covering				-
	Approved Asphalt shingles laid on steel roof structure and fixed as per manufactures instructions including all recquired accessories as ends,barrels,trims and flashings				-
7.2	Roof covering	m ²	80		-
	<u>Wrot Cypress</u>				-
7.3	250 x030mm fascia or barge board	M	35		-
	<u>Eaves Fillings</u>				-
7.4	PVC tounge and grooved eaves fillings with mosquito gauge and ventilation opening to approval	m ²	21		-
	<u>Rainwater disposal (All provisional)</u>				-
	<u>Approved PVC Gutter</u>				-
7.5	U-shaped Pvc gutter fixed to fascia board with approved means	LM	35		-
7.6	100mm Diameter down pipes fixed to wall with brackets at 1200c/c	LM	14		-
8	<u>EXTRA OVER</u>				-
8.1	100mm diameter outlets	NO	4		-
8.2	Rainwater swanneck bend	NO	4		-
8.3	Stopped end	NO	4		-
8.4	Rainwater anti-splash shoe	NO	4		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ABLUTION BLOCKS

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	PAINTING AND DECORATING				
	Knot,prime and prepare and apply three coats gloss exterior oil paint on wood surfaces to:				
8.5	General surfaces of wood	m ²	20.00		-
					-
9	<u>WINDOWS</u>				-
	Mazeras window coping				-
					-
9.1	Windows cill size 200x25mm once sunk,weathered and throated,with 10mm drip paint to approval	M	11		-
					-
	<u>Aluminium Casement Windows</u>				-
	Supply,assemble and fix the following Aluminium framed windows,fabricated from approved composite extruded powder coated heavy duty approved standard hollow sections 100 x 50mm (minimum 2mm thick) including 6mm thick glazing secured on framing with approved with glazing strips and glazing beading including waterproofing all joints using silicon,sealing compounds and approved aluminium brackets;fixing with screws;building in lugs to jams,plugging and screwing head and cill,sealing with mastic,adjusting on completion and all neccessary ironmongery such as hinges,locking devices to architects details and Approval				-
					-
9.2	Windows overall size 1620 x 600mm high	NO	6		-
					-
10	<u>DOORS</u>				-
10.1	Supply and fix 50mm thick wrot mahogany panelled door;overall size 900x2100mm high	NO	2		-
					-
	Supply and fix the following 45mm thick(finished) semi solid core flush door faced both sides with interior quality plywood hardwood lipped all round all to archtects details and approval				-
10.2	Door size 900x 2100mm high	NO	2		-
					-
10.3	Door size 800x 2100mm high	NO	6		-
	Ironmongery				-
	Supply and fix the following ironmongery complete with matching screws all as per "union" catalogue or other aqual and approved				-
					-
10.4	3-lever mortice door lock	NO	2		-
					-
10.5	2-lever mortice door lock	NO	8		-
					-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
10.6	100mm heavy duty steel butt hinges	NO	15		-
10.7	Aproved rubber door stop	NO	10		-
	<u>FRAMES AND FINISHINGS</u>				-
10.8	150x50mm frame with three labours,plugged	M	54		-
10.9	50x20mm rounded architrave with two labours	M	54		-
10.10	20mm diameter quadrant beading ditto.	M	54		-
11	<u>PAINTING AND DECORATING</u>				-
	prepare and apply one coat aluminiumprimer on back of wood before fixing				-
11.1	Surfaces no exceeding 100mm girth	M	108		-
11.2	surfaces 200-300mm girth	M	54		-
	prepare and apply three coats gloss oil paint to wood surfaces internally				-
11.3	General surfaces over 100 and not exceeding 200mm girth	M	108		-
11.4	Surfaces 200-300mm girth	M	54		-
11.5	general surfaces of doors	M2	37		-
12	<u>EXTERNAL WALL FINISHES</u>				-
	15mm thick render as described to :				-
12.1	Sides of concrete or stone block surfaces	m ²	65		-
12.2	Doors and Windows reveals not exceeding 100mm girth	m ²	37		-
	prepare and apply one undercoat and two coats approved exterior paint to:				-
12.3	Externally rendered surfaces	m ²	65		-
12.4	Ditto but not exceeding 100mm girth	M	37		-
13	<u>INTERNAL WALL FINISH</u>				-
	20mm thick gauged lime plaster (1:2:9) as described to:				-
13.1	Sides of walls or concrete surfaces	m ²	191		-
13.2	Door and window reveals not exceeding 100mm girth	m ²	77		-
	15mm thick cement sand (1:4) in				-
13.3	Backing to receive eramic wall tiles (measured seperately)	m ²	80		-
PAGE TOTAL CARRIED TO COLLECTION SHEET					-

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
13.4	Approved ceramic wall tiles as described 300x200x6mm thix tiles on screed backing (m.s) with straight joint				
		M	80		-
					-
	<u>PAINTING AND DECORATING</u> prepare and apply three coats plastic emulsion paint to:				-
					-
					-
					-
13.5	Plastered walls	m ²	191		-
13.6	Door and window reveals not exceeding 100mm girth.				-
		M	77		-
14	FLOOR FINISHES Cement and sand (1:4) screed as described in:				-
					-
					-
					-
14.1	22mm thick backing to receive ceramic floor tiles 300x300x8mm approved non-slip ceramic tiles on screed backing (m.s) with straight joints and pointing in matching cement to floors	m ²	50		-
					-
					-
					-
14.2	paving floors	m ²	50		-
					-
					-
					-
14.3	100mm high skirting	m ²	30		-
					-
					-
					-
	<u>CEILING FINISHES</u>				-
					-
					-
					-
14.4	12.5mm thick chip board ceiling including 100x50mm and 50x50mm bradering at 600mm centers both ways Wrot cypress	m ²	50		-
					-
					-
					-
14.5	75mm wide cornice	m ²	83		-
					-
					-
					-
	PAINTING AND DECORATING prepare and apply one undercoat and three finishing coats of interior quality paint as crown solo pure satin emulsion or other equal and approved to Surfaces of chipboard ceilings				-
		m2	83		-
					-
					-
14.6	prepare and apply three coats of polycurerethane woodseal to boarding,according to manufacturers specifications Surfaces of wood 0-100mm girth				-
		m ²	50		-
					-
					-
	PAGE TOTAL CARRIED TO COLLECTION SHEET(1 No.Ablution block)				-

SIMPLIFIED SEWERS					
ITEM No.	DESCRIPTION	Unit	Qty	Rate	Amount (Kshs.)
1	<p>Consumer Connection Works will commence during the Construction Period and minimal works can extend to the Defects Liability Period (DLP). The connections will be carried out as soon as the simplified sewers are commissioned. Taking Over will be on completion of the Connections. The Contractor should allow for this in their rates. There will be no extra cost of carrying out the Connection Works during DLP.</p> <p>Typical Arrangement for a Consumer Sewer Connection is shown in the Standard Drawings.</p> <p>It is estimated that the approximate number of consumer sewer connections to be carried out in the Project Area is 200. The connection works are to be carried out in liason with with the respective Water Service Provider, who will receive, process and approve the applications for connections.</p> <p>The Contractor to obtain from Water Service Provider the exact number of connections and their locations before ordering materials and carrying out any works under this Bill.</p> <p>CLASS I : PIPEWORK - PIPES</p> <p>1.11 Supply of Pipes Excavation, laying and jointing is included in 'B' - Pipe Laying Supply, Transport to Site and Store. The rate to include jointing materials, bolts, gaskets, rubber rings, etc.</p> <p>1.12 160mm outside diameter uPVC sewer pipe Class 41</p> <p>1.13 200 mm outside diameter uPVC sewer pipe Class 41</p> <p>1.2 Pipe Laying The rate quoted shall be deemed to include excavation and backfilling with selected excavated material, of pipe trenches. The rates shall also include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority, transport of material from site store to working areas, laying and jointing of pipes and fittings.</p> <p>1.21 160mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m</p> <p>1.22 200 mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m</p>				
Total C/F to Next Page					-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				(KShs.)	
2	CLASS J: FITTINGS AND VALVES				
	Supply, transport to site, transport from site store lay, joint and test, 450 Concrete socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing material, rubber rings etc. The rate should also include mass concrete which will be required for reduction of the Y Junction to the respective service lines.				
2.11	160 mm off 200 mm	Nr	100		-
2.12		Nr	350		-
2.13	355mm off 355	Nr	350		-
	Supply, transport to site, transport from site store lay, joint and test, 450 uPVC socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing				
2.14	160mm off 200	Nr	1000		-
2.15	160mm off 315	Nr	300		-
2.16	160mm off 400	Nr	300		-
3	CLASS K - PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES				
	Masonry Inspection Chambers				
3.11	Provide all materials, construct and test sewer inspection chambers of depth not exceeding 1.0m, internal dimensions 450mm x 600mm constructed with 150mm thick masonry walls reinforced with hoop irons at every alternate course as shown on Drawing. Each Chamber is to serve two plots. Include for provision and fixing of light duty rectangular mild steel frame and cover. The cover to be concrete filled as detailed. The rate should be inclusive of two flexible joints adjacent to the Inspection Chamber as detailed and provision	Nr	500		-
	Crossings				
3.12	Allow for crossing existing boundary walls, including reinstatement to original state. Nominal bore not exceeding	Item			
3.13	Allow for crossing existing fences (chain link, barbed wire etc.), including reinstatement to original state. Nominal bore	Item			
Total C/F to Next Page					

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (KShs.)	AMOUNT
4	CLASS L: PIPEWORK - ANCILLARIES TO LAYING AND EXCAVATION				
	Extras to excavation and backfilling in pipe trenches				
4.11	Excavation in rock (Provisional)	m ³	1,000		-
5	CLASS X: MISCELLANEOUS WORKS				
	Testing of the works				
5.1	Allow for water testing of the sewer conection including sewer pipes and inspection chambers as specified including all requisite Materials, Personnel, Testing Equipment etc. Include provision of all equipment and materials	m	4,000		-
	HOUSEHOLD CONNECTION - Water Distributions				
6	<u>PIPE - FITTINGS - SUPPLY AND INSTALL</u>				
	Supply of HDPE pipes in lengths c/w electrofusion Couplers to SSRN 307 PE 100 - Minimum PN 12.5				
	<u>Distribution Pipelines</u>				
	<u>50mm diameter</u>				
6.11	Gatina	m	2,500		-
6.12	Kawamgware	m	500		-
6.13	Other	m	500		-
	<u>63 mm diameter</u>				
6.14	Gatina	m	500		-
6.15	Kawangware	m	1,000		-
	<u>90 mm diameter</u>				
6.16	<u>All</u>	m	500		-
	Supply of GI pipes in 12 m lengths				
	Class B Complete with Sockets Minimum PN 12.5				
	<u>Distribution Pipelines</u>				
	40mm diameter class B GI pipes complete with sockets	m	30		-
	80mm diameter class B GI pipes complete with sockets	m	30		-
	50mm diameter class B GI pipes complete with sockets	m	24		-
7	FITTINGS				
7.11	110mm by 50mm diameter fabricated socketed saddle clamp	no	10		-
7.12	50mm master meter	no	10		-
7.13	50mm short nipple	no	6		-
7.14	32mm Air Valve ARI	no	6		-
7.15	Rubber gasket	m ²	5		-
7.16	50mm diameter gate valve[pegler original]	no	10		-
7.15	50mm valve socket	no	5		-
7.16	50mm diameter GI end cap	no	5		-
7.17	90mm diameter gate valve[pegler original]	no	3		-
7.18	90mm short nipple	no	5		-
7.19	90mm valve socket	no	5		-
7.2	90mm master meter	no	1		-
	Total C/F to Next Page				-

[illegible]

BILL NO. 2A GATINA AND KAWANGWARE COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE ABLUTION				
1	BROUGHT FORWARD FROM PAGE 1			-	
2	BROUGHT FORWARD FROM PAGE 2			-	
3	BROUGHT FORWARD FROM PAGE 3			-	
4	BROUGHT FORWARD FROM PAGE 4			-	
5	BROUGHT FORWARD FROM PAGE 5			-	
6	BROUGHT FORWARD FROM PAGE 6			-	
7	BROUGHT FORWARD FROM PAGE 7			-	
TOTAL FOR 1 ABLUTION BLOCK.					-
TOTAL FOR 3 No. ABLUTION BLOCKS					-

COLLECTION SHEET

ITEM	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	SECTION COLLECTION PAGE SIMPLIFIED SEWERS, HH AND WATER DISTRIBUTION				
	BROUGHT FORWARD FROM ABOVE			-	
8	BROUGHT FORWARD FROM PAGE 8			-	
9	BROUGHT FORWARD FROM PAGE 9			-	
10	BROUGHT FORWARD FROM PAGE 10			-	
11	BROUGHT FORWARD FROM PAGE 11			-	
TOTAL CARRIED TO GRAND SUMMARY					-

DRILLING AND EQUIPPING OF 3 NO. BOREHOLES AND CONSTRUCTION OF 3 NO. ELEVATED WATER TANKS AND CONSTRUCTION OF 8NO WATER KIOSKS					
BILL NO.1 PRELIMINARY AND GENERAL ITEMS					
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
	<u>Contractor's mobilization</u>				
101	Mobilization and demolition of contractor's plant and equipment including but not limited to drilling units, tank erection equipment, test pumping equipment, borehole development equipment, materials, personnel and other required supplies	LS	1		
	<u>Contractor's camp</u>				
102	Establish, maintain and remove Contractor's camps, offices, facilities, etc at the end of the contract..	LS	1		
	<u>Contractor's Borehole Plant</u>				
103	Erecting and dismantling of contractor's borehole plant and equipment including but not limited to drilling unit, test pumping and borehole development units.	LS	1		
	<u>Project Sign Boards</u>				
104	Provide, erect and maintain sign boards as directed by the Project Manager at borehole sites. The rate to include removal and storage as directed by the Project Manger at end of maintenance period.	Nr	10		
	<u>Provisional Sums</u>				
105	Allow Provisional Sum of Kshs 1,500,000.00 to cover the costs of Hydrogeological Survey, Environmental Impact Assessment, preparation and submission of survey and EIA reports, application of authorization to drill and abstraction permits from Water Resources Authority and EIA permits from NEMA to be expended as directed by the Project Manger.	PC	1	1,500,000.00	1,500,000.00
106	Allow Provisional Sum of Kshs 1,000,000.00 for maintaining, fuelling, lubricating and servicing of the transport vehicles assigned to the project for supervision of the works to be expended as directed by the Project Manager.	PC	1	1,000,000.00	1,000,000.00
107	Allow Provisional Sum of Kshs 500,000.00 to cover supervision costs of Engineers assigned on the project from the Employer's head office to cover expenses for communication, transport, allowances etc, to be expended as directed by the Project Manager.	PC	1	500,000.00	500,000.00
108	Add a percentage of items 105, 106 and 106 for contractor's overhead profit.	%	5%	3,000,000.00	150,000.00
BILL TOTAL CARRIED TO SUMMARY SHEET					3,150,000.00

BILL NO. 2: DRILLING OF 3 NO. BOREHOLES					
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
201	Drilling of 228.6mm (9") diameter borehole from 0 - n.e 100m below surface	m	100		-
202	Ditto but 100 - n.e 200m depth	m	100		-
203	Ditto but 200 - n.e 300m depth	m	100		-
204	Supply and installation of n.i.d 152.4mm (6") diameter plain steel casing heavy duty 4.85mm/152 and 5mm/203 to KS 06-259 and BS 1387.	m	250		-
205	Supply and installation of n.i.d 152.4mm (6") diameter steel casing (M/s Plasma cut well screens provision) heavy duty 4.85mm/152 and 5mm/203 to KS 06-259 and BS 1387.	m	144		-
205	Supply and installation of filter gravel pack (2-4mm)	Ton	25		-
207	Development of the boreholes	Hr	12		-
208	Test pumping and recovery measurements to ascertain borehole yield. (Test pumping for 24hr and recovery measurements for 12hr for the borehole)	Hr	36		-
209	Construction of borehole head-works around well head by constructing a concrete plinth and a chamber measuring 1mx1mx1m with class 20/20 mass concrete floor slab and walls. Chamber to have painted Gauge16 steel plate lockable access cover 1mx1m with anti-theft and weather resistant padlock.	No.	1		-
210	Supply and fix 6" borehole steel cap.	No.	1		-
211	Supply and fix 10" surface casing	M	10		-
212	Place a bentonite sanitary seal 3m deep.	LS	1		-
213	Clay Disaggregate calgonTM injection as sodium hexametaphosphate to accealare removal of clay matter / improve on water turbidity : includes cost of injection.	kg	30		-
214	Allow costs for providing water for all requirements of the contract, field camp, drilling works e.t.c.	Sum	1		-
215	Collect water samples and carry out water quality analysis (chemical and bacteriological analysis) in a reputable laboratory acceptable to the Project Manager and submit water quality test report.	No.	2		-
216	Allow costs for collecting formation samples and prepare Geological logging charts.	No.	1		-
217	Complete the prescribed WRMA Borehole drilling completion report and submit to WRMA	No.	1		-
	Total for Drilling 1No. Borehole				-
BILL TOTAL FOR DRILLING 3 NO. BOREHOLES CARRIED TO SUMMARY SHEET					-

BILL NO. 3: EQUIPPING OF 3 NO. BOREHOLES					
ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
301	<p>Provide, install and commission a submersible pump capable of delivering 20m3/hr against a head of 250m or as directed by the Project Manager.</p> <p>NB: Indicate the make of the pump and motor. Size of casing is 203mm.</p> <p>Pump Make : GRUNDFOS SP 30-26</p> <p>Country of Origin: DENMARK</p> <p>Make of Motor: TESLA/GRUNDFOS ITALY/ DENMARK rate 22KW/30HP.</p>	Nr	1		-
302	<p>Provide, install and commission a 3 phase, 415Vac, DOL control panel for the above pump comprising of the following:- Provisional</p> <p>a) Appropriate rating contactor</p> <p>b) Appropriate rating thermal overload relay</p> <p>c) Over/under voltage phase failure protection relay</p> <p>d) Voltmeter</p> <p>e) Voltmeter selection switch</p> <p>f) Water level relay</p> <p>g) Appropriate Ammeter</p> <p>h) Appropriate MCCB for the mains</p> <p>i) Appropriate MCCB for the control circuit</p> <p>j) Start, Stop/reset push button (Green marked "START", and Black/Red Marked "STOP/RESET")</p> <p>k) Pilot indicator lights (green marked "PUMP RUN", red marked "OVER LOAD TRIPPED", yellow marked "BOREHOLE LOW, white marked "TANK HIGH" etc</p> <p>l) Hours run counter range 0 - 99999 hours</p> <p>m) Cable looping box of appropriate rating</p>	LS	1		-
303	Enhanced MP204 Blackbox unit to integral circuit	No	1		-
	NB: A schematic and control wiring diagram MUST be supplied with the starter.				
304	3" class B G.I rising main pipe c/w pipe locking clamp including connecting to the existing tank and connecting for both water offices and Main House boreholes.	m	220		-
305	Supply of 3" crane sockets to the rising main	No.	42		-

306	Provide and install one 3" bulk flow meter class B (type and make to be approved by the Project Manager) c/w Non Return Valve at the well head. Rate to include all pipe and fittings at the well head.	No.	1		-
307	Electrode cable(pair)	m	440		-
308	Electrode pencils (pair)	No.	1		-
309	25mm Dipper tube complete	m	240		-
310	1.5mm ² Flat cable for float switch	m	100		-
311	2"*6" borehole cover c/w sundries	No.	1		-
312	1.5mm ² 2-CORE underground armoured cable – Electrodes	m	100		-
313	63A switch fuse "MEM" or equivalent	No.	1		-
314	Allow a P.C. Sum for electricity supply and connection to the borehole sites. Contractor is responsible for the application of electricity connection; follow up and for prompt supply and connection of electricity by KPLC. Electricity account to be held in the name of the Employer .	PC	pc		-
315	Add a percentage of items 315 for contractor's overheads and profit.	%	10%		-
316	Allow a sum for testing and commissioning of the borehole equipping works.	LS	1		-
319	Provide for float switch to existing elevated tank and connect to the control panel and pump	sum	1		-
320	4 FT Copper earth rod complete with clamp	Set	1		-
321	Lead cable 10.0m2 single core (for earthing)	m	10		-
322	Submersible cable rubber sheathed 25mm ² 3 core submersible armored cable	m	240		-
323	Underground armored cable 25mm ² 3 core	m	95		-
324	Construction of a well ventilated pump house 3mx2m internal dimension and 2.2m clear height with concrete roof slab reinforced with Y12 at 150 c/c both directions. Rate to include provision of steel door of gauge 16 (1.5mm thick) metal plates complete with two anti-theft and weather resistant padlocks all to the approval of the project manager. the walls shall be constructed with 225*225mm stone masonry fine dressed. Place hoop iron 3/4" on every course.	LS	1		-
325	Construction of borehole area perimeter fence approximately 100m long using 2.1m high chainlink G14 and 65 x 65 x 5mm thick steel angle lines at 2m centre to centre embedded in mass concrete 0.6m deep and diameter strutted at all corners of straight lines	m	100		-
326	Provide 6No. Strands of wire G12 and secure the chainlink using blinding wire G16	m	100		-
327	Provide and fix hinged and lockable steel grided gate 2m wide with frame of 75mm class B pipes embedded in concrete as shall be directed.	Nr	1		-
Total for Equipping 1No. Borehole					-
BILL TOTAL FOR EQUIPPING 3 NO. BOREHOLES CARRIED TO SUMMARY SHEET					-

BILL NO. 3: CONSTRUCTION OF 3NO. 24M3 ELEVATED PRESSED STEEL TANKS ON 18M STEEL TOWER

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KSKS)	AMOUNT (KSHS)
	<u>Excavation</u>				
	<u>Excavation shall include strutting,shuttering,stabilizing excavated surface and keeping excavations free of water bailing out, pumping or other means.</u>				
401	Excavate to reduced levels in top soil for depth not exceeding 0.25	M3	2		-
402	Excavate for tank foundation 0.25-0.5m	M3	10		-
403	Ditto but in material other than top soil,rock or hard material depth 0.5-1m	M3	10		-
404	Ditto but in material other than top soil,rock or artificially hard material depth 1-2m	M3	10		-
405	Ditto but in rock depth 1-2m	M3	2		-
	<u>Filling</u>				
	<u>Filling to completed structure including compaction as specified</u>				
406	Fill and compact selected excavated material other than top soil,rock or artificially hard material	M3	20		-
	<u>Disposal of Excavated Materials</u>				
407	Dispose excavated materials other than rock as directed by the Engineer	M3	12		-
408	Dispose excavated material rock or artificially hard materials on site as directed by the Engineer	M3	2		-
	<u>In situ Concrete:Provision and placing.</u>				
	<u>Rate to include for shuttering</u>				
	<u>Mass concrete Class 15/20</u>				
409	Blinding layer 50mm thick	M3	2		-
	<u>Reinforced Vibrated Concrete Class 25/20</u>				
410	Footing and stub columns for steel columns	M3	12		-
	<u>Reinforcement</u>				
	<u>High yield hot rolled ribbed bars BS4449.Rate to include for Supply,delivering,cutting,bending,supporting and securing in concrete.</u>				
411	High Yield bars	Ton	2		-
	<u>Pressed Steel Tank</u>				
412	Supply and install pressed steel tank 24m ³ capacity complete with roof access hatch,access ladder,float level indicator,pipework and 18m steel Tower frame as per the drawings and specifications.Plate thickness to be 6.0mm for the tank bottom and first level side panels, 4.5mm thick plates for the second and third levels side panels and 2mm for roof. Include for all bolts,jointing material, protection paint and any other necessary materials. Tank panels to be wire brushed and painted externally with one coat of grey primer and two coats of silver aluminium paint. Internally the panels are painted with two coats of non-toxic black bituminous paint. Touch up paint to be applied at site after erection to cover any marks	Nr	1		-
	<u>Pipework</u>				
	<u>These are pipes in the vicinity of the tank,including connecting the inlet pipe to the pumping main</u>				
413	Supply and fix 38mm diameter GI Class "B" Tank inlet pipe	m	15		-
414	Supply and fix 63mm diameter GI Class B Tank	m	24		-
415	Supply and fix 63mm diameter GI Class B Tank	m	6		-
416	Supply and fix 63mm diameter GI Class B Tank	m	15		-
	<u>Valves and fittings</u>				
417	Supply and install DN50 PN10 sluice valve for scour	Nr	1		-
418	Supply and install DN38 PN10 Sluice valve for the outlet	Nr	1		-
419	Supply and fix double flanged DN32 90° Short radius bend	Nr	3		-
420	Supply and fix double flanged DN50 -90° Short radius bend	Nr	8		-
421	Supply and fix all flanged DN50X50 Tee	Nr	1		-
422	Supply and fix all flanged DN38X38 Tee	Nr	2		-
423	DN50 Double flange piece, length 1000mm	Nr	2		-
424	DN50 Double flange piece, length 300mm	Nr	2		-
425	DN50 Double flange piece, length 500mm	Nr	2		-
426	Supply and apply recommended disinfectant and test the tank	Sum	1		-
	Total for Construction of 1No. Elevated Tank				-
TOTAL FOR CONSTRUCTION OF 3 NO. ELEVATED WATER TANKS CARRIED TO SUMMARY SHEET					-

SUMMARY SHEET		
BILL	DESCRIPTION	
BILL NO. 1	PRELIMINARY AND GENERAL ITEMS	3,150,000.00
BILL NO. 2	DRILLING OF 3 NO. BOREHOLES	-
BILL NO. 3	EQUIPPING OF 3 NO. BOREHOLES	-
BILL NO. 4	CONSTRUCTION OF 3 NO. 24M3 ELEVATED PREESSED STEEL WATER TANK ON 12M STEEL TOWER	-
GRAND TOTAL		3,150,000.00

BILL NO. 9: SEWER CONNECTION TYPE B**PLOT WITH EXISTING PIT LATRINE TO BE CONVERTED TO POUR FLUSH TOILET AND
CONNECTED TO NEW SEWER NETWORK**

ITEM NO.	DESCRIPTION	UNIT	QTY	RATE (KShs)	AMOUNT (KShs)
	<u>ELEMENT NO.1</u>				
1	<u>EXHAUSTION</u>				
	Provide for exhaustion Services for the existing Pit Latrines and Disposal at a Location approved by WSP				
1.1	Exhaustion of 1 No. Pit latrine	No	1		-
2	<u>DEMOLISH EXISTING SUPERSTRUCTURE</u>				
	Provide for demolition of existing superstrucure walls, door, roof etc. : set aside re-usable materials and dispose other materials				
2.1	Demolition of 1 No. Latrine	Sum			-
2.2	Demolish Existing thick Latrine floor slab and dispose slab material	SM	6		-
3	<u>BACKFILLING</u>				
	Provide for Backfilling of exhausted Pit Latrine with hardcore and compact firmly				
3.1	Backfilling and Compaction of 1No. Pit Latrine (including cost of labour)	m ³	1000		-
4	<u>INSTALLATION OF POWERFLUSH SYSTEM</u>				
	<u>CONCRETE WORKS AND PLUMBING WORK</u>				
	Install OD160 UPVC Class 41 Sewer Pipe from W.C to L. and from LC. To nearby manhole				
4.1	UPVC 160mm	m	20		-
4.2	Construct New 450 x 600mm External Inspection Chamber	Nr	1		-
4.3	Reconstruct the superstructure including Walls ,door and roof Machine Dressed Stone Walling in cement sand (1:3) mortar 150mm	SM	13		-
	ALUZINC sheet Meatl roofing, N.C 11/3" Corrugated sheets and BP760 Boxed Profile 28G and installation	SM	2		-
4.4	Construct 100mm thick class 20/20 floor slab ,including installation of ceramic squat type W.C Bowl complete with fittings				
	100 mm slab ,Class 20/20	m3	0.200		-
	W.C bowl and complete with fittings	No.	1		-
	Ceramic handwash Basin complete with tap	No.	1.00		-
	TOTAL COST FOR 1 CONVERSION				-
	Grand Total for 150 Number converted carried to Grand Summary				-

BILL NO.10 REHABILITATION OF 25 NO. ABLUTION BLOCKS

ABLUTION BLOCKS

CONNECTING EXISTING ABLUTION BLOCKS TO SEWER LINE

ITEM No.	DESCRIPTION	Unit	Qty	Rate	Amount (Kshs.)
1	CLASS I : PIPEWORK - PIPES				
1.11	Supply of Pipes				
	Excavation, laying and jointing is included' - Pipe Laying Supply, Transport to Site and Store. The rate to include jointing materials, bolts, gaskets, rubber rings, etc.				
1.12	160mm outside diameter uPVC sewer pipe Class 41	m	96		-
1.13	200 mm outside diameter uPVC sewer pipe Class 41	m	24		-
1.2	Pipe Laying				
	The rate quoted shall be deemed to include excavation and backfilling with selected excavated material, of pipe trenches. The rates shall also include disposal of surplus material to tips identified by the Contractor in liaison with the Local Authority, transport of material from site store to working areas, laying and jointing of pipes and fittings.				
1.21	160mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m	m	12		-
1.22	200 mm outside diameter uPVC sewer pipe Class 41 Depth not exceeding 2.5m	m	96		-
2	CLASS J: FITTINGS AND VALVES				
	Supply, transport to site, transport from site store lay, joint and test, 450 Concrete socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing material, rubber rings etc. The rate should also include mass concrete which will be required for reduction of the Y Junction to the respective service lines.				
2.11	160 mm off 200 mm	Nr	3		-
	Supply, transport to site, transport from site store lay, joint and test, 450 uPVC socketed Y Junctions. The rate to include lean concrete plug and sorround, jointing				
2.14	160mm off 200	Nr	3		-
Total C/F to Next Page					-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				(KShs.)	
3	CLASS K - PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES				
3.11	Masonry Inspection Chambers Provide all materials, construct and test sewer inspection chambers of depth not exceeding 1.0m, internal dimensions 450mm x 600mm constructed with 150mm thick masonry walls reinforced with hoop irons at every alternate course as shown on Drawing. Each Chamber is to serve two plots. Include for provision and fixing of light duty rectangular mild steel frame and cover. The cover to be concrete filled as detailed. The rate should be inclusive of two flexible joints adjacent to the Inspection Chamber as detailed and provision	Nr	10		-
3.12	Crossings Allow for crossing existing boundary walls, including reinstatement to original state. Nominal bore not exceeding 160mm	Item			
3.13	Allow for crossing existing fences (chain link, barbed wire etc.), including reinstatement to original state. Nominal bore	Item			
4	CLASS L: PIPEWORK - ANCILLARIES TO LAYING AND EXCAVATION				
4.11	Extras to excavation and backfilling in pipe trenches Excavation in rock (Provisional)	m ³	10		-
5	CLASS X: MISCELLANEOUS WORKS				
5.1	Testing of the works Allow for water testing of the sewer conection including sewer pipes and inspection chambers as specified including all requisite Materials, Personnel, Testing Equipment etc. Include provision of all equipment and materials	m	96		-
6	<u>REPLACEMENT OF TOILET FIXTURES</u>				
6.1.	W.C bowl and complete with fittings	No.	5		-
6.2.	Ceramic handwash Basin complete with tap	No.	4.00		-
7	EXTERNAL WALL FINISHES prepare and apply one undercoat and two coats approved exterior paint to:				-
8.1.	Externally rendered surfaces	m ²	100		-
8.2.	Ditto but not exceeding 100mm girth	M	100		-
Total C/F to Next Page					-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				(KShs.)	
	<u>INTERNAL WALL FINISHES</u>				
8.3.	prepare and apply three coats plastic emulsion paint to: Plastered walls	m ²	191		-
8.4.	Door and window reveals not exceeding 100mm girth.	M	10		-
9	LOCKS				
	Provisional sum for supply and installation of Locks	sum			
10	<u>CONNECTING EXISTING ABLUTION BLOCKS TO RELIABLE WATER SUPPLY</u>				
	<u>PIPE - FITTINGS - SUPPLY AND INSTALL</u>				
	Supply of HDPE pipes in lengths c/w electrofusion				
	Couplers to SSRN 307 PE 100 - Minimum PN 12.5				
	<u>Distribution Pipelines</u>				
10.1	63 mm diameter For 10 No. Ab;ution blocks	m	500		-
11	FITTINGS				
11.1	110mm by 50mm diameter fabricated socketed saddle clamp	no	5		-
11.2	50mm master meter	no	5		-
11.3	50mm short nipple	no	5		-
11.4	32mm Air Valve ARI	no	5		-
11.5	Rubber gasket	m ²	5		-
11.6	63mm diameter gate valve (pegler original)	no	5		-
11.7	63mm short nipple	no	5		-
11.8	63mm valve socket	no	5		-
11.9	63mm master meter	no	5		-
12	63mm diameter GI end cap	no	5		-
12.1	chamber	no	5		-
12.2	Tangit	kg	5		-
12	TESTING				
12.1	Test pressure not exc. 12 bar,	m	500		-
12.2	pipe n.b. exc 50 but not exc. 100 mm.				
13	STERILISATION AND FLUSHING				
13.1	pipe n.b. exc 50 but not exc. 100 mm.	m	500		-
Total C/F to Next Page					-
TOTAL FOR REHABILITATION OF 1 ABLUTION BLOCK					-
TOTAL FOR REHABILITATION OF 25 ABLUTION BLOCKS					-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				(KShs.)	
	<u>DEMOLITION AND RECONSTRUCTION OF NDEITHIE NGUTEITHIE ABLUTION BLOCK</u>				
	Provide for demolition of existing superstrucure walls, door, roof etc	Sum			
	Provide for construction of 1 No. Ablution Block				
	Total For Demolition and Reconstruction				-
	CARRIED TO GRAND SUMMARY				
1	DEMOLITION AND RECONSTRUCTION OF NDEITHIE NGUTEITHIE ABLUTION BLOCK				-
2	REHABILITATION OF 25 NO. ABLUTION BLOCKS				-
TOTAL CARRIED TO GRAND SUMMARY					-

2. Table C: Schedule of Payment Currencies

For Whole of the Works

	A	B	C	D
Name of Payment Currency	Amount of Currency	Rate of Exchange to Local Currency	Local Currency Equivalent $C = A \times B$	Percentage of Total Bid Price (TBP) $\frac{100 \times C}{TBP}$
Local currency _____		1.00		
Foreign Currency #1 _____				
Foreign Currency #2 _____				
Foreign Currency #3 _____				
Total Bid Price				100.00
Provisional Sums Expressed in Local Currency		1.00		
BID PRICE				

3. Schedule(s) of Adjustment Data

Table A - Local Currency

Index Code	Index Description	Source of Index	Base Value and Date	Bidder's Local Currency Amount	Bidder's Proposed Weighting
Fixed	Nonadjustable	—	—	—	A: 0.10
SO	Steel				B: _____
CE	Cement				C: _____
FU	Fuels/Oils and Lubricants				D: _____
LL	Labour (Local)				E: _____
LF	Labour (Foreign)				F: _____
RS	Reinforcement steel				G: _____
Total					1.00

Table B - Foreign Currency

Name of Currency: _____

If the Bidder 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	Bidder's Currency in Type/Amount	Equivalent in FC1	Bidder's Proposed Weighting
Fixed	Nonadjustable	—	—	—		A: 0.10
BI	Steel					B: _____
CE	Cement					C: _____
FU	Fuels/Oils and Lubricants					D: _____
LL	Labour (Local)					E: _____
LF	Labour (Foreign)					F: _____
RS	Reinforcement steel					G: _____
Total						1.00

Forms of Bid Security

Form of Bid Security - Bank Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: _____ *[Insert name and address of the Employer]*

Invitation for Bids No: _____ *[Employer to insert the same IFB number as advertised]*

OCB No: _____ *[Employer to insert same OCBI number as in procurement plan]*

Date: _____ *[Insert date of issue]*

BID GUARANTEE No.: _____ *[Insert guarantee reference number]*

Guarantor: _____ *[Insert Guarantor's name and address of place of issue, unless indicated in the letterhead]*

We have been informed that _____ *[insert name of the Bidder, which in the case of a joint venture shall be the name of the joint venture (whether legally constituted or prospective) or the names of all members thereof]* (hereinafter called "the Applicant") has submitted to the Beneficiary its Bid (hereinafter called "the Bid") for the execution of _____ *[insert description of contract]* under Invitation for Bids No. _____ *[insert number]* ("the IFB") and Open Competitive Bidding No. _____ ("the OCB").

Furthermore, we understand that, according to the Beneficiary's conditions, Bids must be supported by a Bid guarantee.

At the request of the Applicant to issue this guarantee, we _____ {Name of the bank} as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in letters]* (*insert amount in numbers*) upon receipt by us of the Beneficiary's complying supported by the Beneficiary's statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating either that the Applicant:

- (a) has withdrawn its Bid during the period of Bid validity specified by the Applicant in the Letter of Bid ("the Bid Validity Period"), or any extension thereto provided by the Applicant; or
- (b) having been notified of the acceptance of its Bid by the Beneficiary during the period of Bid validity, (i) fails to execute the contract agreement or (ii) fails to furnish the performance security and, if required, the Environmental and Social (ES) Performance Security, in accordance with the Instructions to Bidders ("ITB") of the Beneficiary's bidding document.

This guarantee will expire: (a) if the Applicant is the successful Bidder, upon our receipt of copies of the contract agreement signed by the Applicant and the performance security and, if required, the Environmental and Social (ES) Performance Security, issued to the Beneficiary in relation to such contract agreement; and (b) if the Applicant is not the successful Bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Applicant of the results of the Bidding process; or (ii) twenty-eight days after the end of the Bid Validity Period.

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

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

[signature(s)]

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

Form of Bid Security – Bid Bond

[The Surety shall fill in this Bid Bond Form in accordance with the instructions indicated.]

Date: [date (as day, month and year)] _____

IFB No. _____

OCB No.: [number as in procurement plan].

Alternative No.: [insert identification No. if this is a Bid for an alternative] _____

BOND NO. _____

BY THIS BOND *[name of Bidder]* as Principal (hereinafter called “the Principal”), and *[name, legal title, and address of surety]*, authorized to transact business in *[name of country of Employer]*, as Surety (hereinafter called “the Surety”), are held and firmly bound unto *[name of Employer]* as Obligee (hereinafter called “the Employer”) in the sum of *[amount of Bond]*¹⁴ *[amount in words]*, for the payment of which sum, well and truly to be made, we, the said Principal and Surety, bind ourselves, our successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has submitted a written Bid to the Employer dated the ____ day of _____, 20__, for the execution of *[name of Contract]* (hereinafter called the “Bid”).

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal:

- (a) has withdrawn its Bid during the period of bid validity set forth in the Principal’s Letter of Bid (“the Bid Validity Period”), or any extension thereto provided by the Principal; or
- (b) having been notified of the acceptance of its Bid by the Employer during the Bid Validity Period or any extension thereto provided by the Principal: (i) failed to execute the contract agreement; or (ii) has failed to furnish the Performance Security and, if required, the Environmental and Social (ES) Performance Security, in accordance with the Instructions to Bidders (“ITB”) of the Employer’s bidding document.

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

The Surety hereby agrees that its obligation will remain in full force and effect up to and including the date 28 days after the date of expiration Bid Validity Period set forth in the Principal’s Letter of Bid or any extension thereto provided by the Principal.

IN TESTIMONY WHEREOF, the Principal and the Surety have caused these presents to be executed in their respective names this ____ day of _____ 20__.

¹⁴ The amount of the Bond shall be denominated in the currency of the Employer’s country or the equivalent amount in a freely convertible currency.

Principal: _____

Surety:

Corporate Seal (where appropriate)

(Signature)

(Printed name and title)

(Signature)

(Printed name and title)

Form of Bid-Securing Declaration

Date: *[insert date (as day, month and year)]*
OCBI/LCB No.: *[insert number as in procurement plan]*
Alternative No.: *[insert identification No if this is a Bid for an alternative]*

To: *[insert complete name of Employer]*

We, the undersigned, declare that:

We understand that, according to your conditions, bids must be supported by a Bid-Securing Declaration.

We accept that we will automatically be suspended from being eligible for bidding in any contract with the Employer for the period of time of *[insert number of months or years consistent with BDS 19.9]*, if we are in breach of our obligation(s) under the bid conditions, because we:

- (a) have withdrawn our Bid during the period of Bid validity specified in the Letter of Bid; any extension thereto provided by us or
- (b) having been notified of the acceptance of our Bid by the Employer during the period of bid validity, (i) fail or refuse to execute the Contract, if required, or (ii) fail or refuse to furnish the Performance Security and, if required, the Environmental and Social (ES) Performance Security, in accordance with the ITB.

The start date of suspension shall be the first date we perform any of the actions mentioned in paragraphs (a) and (b) above. We understand this Bid-Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight days after the expiration of our Bid.

Name of the Bidder* *[insert complete name of person signing the Bid]*

Name of the person duly authorized to sign the Bid on behalf of the Bidder

****** *[insert complete name of person duly authorized to sign the Bid]*

Title of the person signing the Bid

[insert complete title of the person signing the Bid]

Signature of the person named above *[insert signature of person whose name and capacity are shown above]*

Date signed: *[insert date of signing]* day of *[insert month]*, *[insert year]*

* In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

****** Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid *[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all members to the Joint Venture that submits the Bid.]*

Technical Bid

Technical Bid Forms

- **Technical Bid-Base Bid**
- **Key Personnel Schedule**
- **Equipment**
- **Site Organization**
- **Method Statement**
- **Mobilization Schedule**
- **Construction Schedule**
- **ES Management Strategies and Implementation Plans**
- **Code of Conduct (ES)**
- **Others**

Technical Bid-Base Bid

OCB No:

[Note for information of Bidder: Bidders shall demonstrate compliance with the Employer's requirements and Technical Specifications as described in Section VII of the Bidding Documents. Any departures or deviations from the required Technical Specifications shall be highlighted and if there are none, full compliance shall be confirmed.

The Bidder shall provide the Technical Bid for the Base-Bid complete in all respect including Technical information and standards, codes, designs and specifications, of Works offered along with all documentation mentioned in ITB 16 and Section VII of the Bidding Document. This will include relevant literatures, data or drawings, test results and other supporting documents, including all information requested in the Bidding Document and as may be necessary to establish conformity with the Employer's Specifications and requirements.

Any deviations in the technical standards, codes, designs or specifications or other requirements from those stated in the Bidding Documents shall be explained indicating their impact on the performance requirements, characteristics or parameters of the works. To this end, for any such deviations to be acceptable, Bid shall establish to the satisfaction of the Employer substantial responsiveness to the required technical specifications by explaining and documenting for the offered works, equivalency with or improvement to the required technical standards, codes, designs and Specifications.

Any Major deviation from the Employer's requirements shall be the cause for rejection of the Bid. Any deviation which in the Bidder's opinion is considered minor, the Bidder shall provide evidence to this effect including evidence of any monetary implications caused by such deviation. The Employer's evaluation shall be independent of Bidder's opinion on such matters and shall be final]

FORM PER -1

OCB No..... /

Key Personnel Schedule

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

Key Personnel

1.	Title of position:	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
2.	Title of position: <i>[Environmental Specialist]</i>	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
3.	Title of position: <i>[Health and Safety Specialist]</i>	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
4.	Title of position: <i>[Social Specialist]</i>	
	Name of candidate:	

	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
5.	Title of position: Sexual Exploitation, Abuse and Harassment Expert <i>[Where a Project SEA risks are assessed to be substantial or high, Key Personnel shall include an expert with relevant experience in addressing sexual exploitation, sexual abuse and sexual harassment cases]</i>	
	Name of candidate	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
6.	Title of position: <i>[insert title]</i>	
	Name of candidate	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>

Form PER-2

OCB No.....

Resume and Declaration - Key Personnel

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

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

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

Declaration

I, the undersigned Key Personnel, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

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

Commitment	Details
Commitment to duration of contract:	<i>[insert period (start and end dates) for which this Key Personnel is available to work on this contract]</i>
Time commitment:	<i>[insert the number of days/week/months/ that this Key Personnel will be engaged]</i>

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

- (a) be taken into consideration during Bid evaluation;
- (b) my disqualification from participating in the Bid;
- (c) my dismissal from the contract.

Name of Key Personnel: *[insert name]*

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day month year): _____

Equipment

OCB No.....

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III (Evaluation and Qualification Criteria). A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder. The Bidder shall provide all the information requested below, to the extent possible. Fields with asterisk (*) shall be used for evaluation.

Type of Equipment*		
Equipment Information	Name of manufacturer,	Model and power rating
	Capacity*	Year of manufacture*
Current Status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

The following information shall be provided only for equipment not owned by the Bidder.

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

Site Organization

OCB No.....

[insert Site Organization information]

Method Statement

OCB No.....

[insert Method Statement]

Mobilization Schedule

OCB No.....

[insert Mobilization Schedule]

Construction Schedule

OCB No.....]

[insert Construction Schedule]

ES Management Strategies and Implementation Plans

(ES-MSIP)

OCB No.....

- (i) The Bidder shall submit comprehensive and concise Environmental and Social Management Strategies and Implementation Plans (ES-MSIP) as required by ITB 11.1 (k) of the Bid Data Sheet. These strategies and plans shall describe in detail the actions, materials, equipment, management processes etc. that will be implemented by the Contractor, and its subcontractors.
- (ii) In developing these strategies and plans, the Bidder shall have regard to the ES provisions of the contract including those as may be more fully described in the Works Requirements in Section VII.

Code of Conduct for Contractor's Personnel (ES) Form

OCB No.....

Note to the Bidder:

The minimum content of the Code of Conduct form as set out by the Employer shall not be **substantially modified**. However, the Bidder may add requirements as appropriate, including to take into account Contract-specific issues/risks.

The Bidder shall initial and submit the Code of Conduct form as part of its bid.

CODE OF CONDUCT FOR CONTRACTOR'S PERSONNEL

We are the Contractor, *[enter name of Contractor]*. We have signed a contract with *[enter name of Employer]* for *[enter description of the Works]*. These Works will be carried out at *[enter the Site and other locations where the Works will be carried out]*. Our contract requires us to implement measures to address environmental and social risks related to the Works, including the risks of sexual exploitation, sexual abuse and sexual harassment.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the Works. It applies to all our staff, laborers and other employees at the Works Site or other places where the Works are being carried out. It also applies to the personnel of each subcontractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as “**Contractor's Personnel**” and are subject to this Code of Conduct.

This Code of Conduct identifies the behavior that we require from all Contractor's Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behavior will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

REQUIRED CONDUCT

Contractor's Personnel shall:

1. carry out his/her duties competently and diligently;
2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. maintain a safe working environment including by:
 - a. ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
 - b. wearing required personal protective equipment;
 - c. using appropriate measures relating to chemical, physical and biological substances and agents; and

- d. following applicable emergency operating procedures.
- 4. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
- 5. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
- 6. not engage in Sexual Harassment, which means unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature with other Contractor's or Employer's Personnel;
- 7. not engage in Sexual Exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another;
- 8. not engage in Sexual Abuse, which means the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;
- 9. not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage;
- 10. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract, including on health and safety matters, and Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH);
- 11. report violations of this Code of Conduct; and
- 12. not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the grievance mechanism for Contractor's Personnel or the project's Grievance Redress Mechanism.

RAISING CONCERNS

If any person observes behavior that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contact [*enter name of the Contractor's Social Expert with relevant experience in handling gender-based violence, or if such person is not required under the Contract, another individual designated by the Contractor to handle these matters*] in writing at this address [] or by telephone at [] or in person at []; or
2. Call [] to reach the Contractor's hotline (*if any*) and leave a message.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behavior prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

CONSEQUENCES OF VIOLATING THE CODE OF CONDUCT

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

FOR CONTRACTOR'S PERSONNEL:

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [*enter name of Contractor's contact person with relevant experience*] requesting an explanation.

Name of Contractor's Personnel: [insert name]

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Contractor:

Signature: _____

Date: (day month year): _____

ATTACHMENT 1: Behaviors constituting Sexual Exploitation and Abuse (SEA) and behaviors constituting Sexual Harassment (SH)

ATTACHMENT 1 TO THE CODE OF CONDUCT FORM**BEHAVIORS CONSTITUTING SEXUAL EXPLOITATION AND ABUSE (SEA) AND
BEHAVIORS CONSTITUTING SEXUAL HARASSMENT (SH)**

OCB No.....

The following non-exhaustive list is intended to illustrate types of prohibited behaviors:

(1) Examples of sexual exploitation and abuse include, but are not limited to:

- A Contractor's Personnel tells a member of the community that he/she can get them jobs related to the work site (e.g. cooking and cleaning) in exchange for sex.
- A Contractor's Personnel that is connecting electricity input to households says that he can connect women headed households to the grid in exchange for sex.
- A Contractor's Personnel rapes, or otherwise sexually assaults a member of the community.
- A Contractor's Personnel denies a person access to the Site unless he/she performs a sexual favor.
- A Contractor's Personnel tells a person applying for employment under the Contract that he/she will only hire him/her if he/she has sex with him/her.

(2) Examples of sexual harassment in a work context

- Contractor's Personnel comment on the appearance of another Contractor's Personnel (either positive or negative) and sexual desirability.
- When a Contractor's Personnel complains about comments made by another Contractor's Personnel on his/her appearance, the other Contractor's Personnel comment that he/she is "asking for it" because of how he/she dresses.
- Unwelcome touching of a Contractor's or Employer's Personnel by another Contractor's Personnel.
- A Contractor's Personnel tells another Contractor's Personnel that he/she will get him/her a salary raise, or promotion if he/she sends him/her naked photographs of himself/herself.

Others

OCB No.....

Commercial Terms and Conditions

OCB No.....

[Bidder shall specify any deviations to the provisions of the Bidding Document (other than Technical Specifications) in particular those specified in Part 3 of the Bidding document including General and Particular Conditions of Contract. If "None" it shall be confirmed accordingly]

Bidder's Qualification

OCB No.....

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

Form ELI -1.1: Bidder Information Form

Date: _____

OCB No. and title: _____

Page _____ of _____ pages

Bidder's name

In case of Joint Venture (JV), name of each member:

Bidder's actual or intended country of registration:

[indicate country of Constitution]

Bidder's actual or intended year of incorporation:

Bidder's legal address [in country of registration]:

Bidder's authorized representative information

Name: _____

Address: _____

Telephone/Fax numbers: _____

E-mail address: _____

1. Attached are copies of original documents of

- ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.4.
- ☐ In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1.
- ☐ In case of state-owned enterprise or institution, in accordance with ITB 4.6 documents establishing:
- Legal and financial autonomy
 - Operation under commercial law
 - Establishing that the Bidder is not under the supervision of the Employer

2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.
[If required under BDS ITB 47.1, the successful Bidder shall provide additional information on beneficial ownership, using the Beneficial Ownership Disclosure Form.]

Form ELI -1.2: Information Form for JV Bidders

(to be completed for each member of Joint Venture)

Bidder's Name: _____

Date: _____

JV Member's Name _____

OCBI No. and title: _____

Page _____ Of _____ pages

Name of the Reporting Firm _____

JV Information of the Reporting Firm

Bidder's Joint Venture name:
JV member's name:
JV member's country of registration:
JV member's year of constitution:
JV member's legal address in country of constitution:
JV member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
<p>1. Attached are copies of original documents of</p> <p><input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.4.</p> <p><input type="checkbox"/> In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and is not under the supervision of the Employer, in accordance with ITB 4.6.</p> <p>2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership. <i>[If required under BDS ITB 47.1, the successful Bidder shall provide additional information on beneficial ownership for each JV member using the Beneficial Ownership Disclosure Form.]</i></p>

Form ELI -1.3**Eligible Materials, Equipment and Services Form**

(to be completed by the Bidder)

Bidder's Name: _____

Date: _____

OCBI No. and title: _____

Page _____ of _____ pages

Eligible Materials, Equipment and Services: In compliance with ITB 5, provide the following information for all Materials, Equipment and Services included under the Contract. Instead of listing each and every item, broad categories are listed below. Include all items in these categories unless any item to be supplied is not covered by any one of them in which case list them separately.

1 S. No.	2 Description of Broad Category of Materials/Equipment and Services	3 Estimated Quantity- [State: "All quantity as required" or quantity by subcategory of items]	Estimated Aggregate Value (US Dollar Equivalent)	5 Countries of Origin
1	All Construction and Testing Materials including raw materials, Cement, Steel, Timber, Lime, Sand, Aggregates, Plastics, Bitumen, Oils, Lubricants, etc. as per specification			
2	All types of Plants, Equipment including Laboratory and Testing Equipment, All types of Vehicles, Furniture, Fittings and Fixtures, Pipes, Tools, Steel and Other Structures, Utensils, Computers and Other IT Equipment, etc. as per specification			
3	All Types of Services including Construction, Installation, Assembly, Inspection, Supervision, Care of Sites, Labor (Skilled and Unskilled), Drilling, Mapping, Transportation and Insurance, etc. as per specification			
4				
5				

Form CON – 2: Historical Contract Non-Performance, Pending Litigation and Litigation History

[The form shall be filled in for the Bidder, and each member of a Joint Venture, if Bidder is a JV]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

OCB No. and title: _____

Page _____ of _____ pages

Name of the Reporting Firm _____

Historical Contract Non-Performance, Pending Litigation and Litigation History of the Reporting Firm

Non-Performed Contracts in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> Contract non-performance did not occur since 1 st January 2017 specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1.			
<input type="checkbox"/> Contract(s) not performed since 1 st January 2017 specified in Section III, Evaluation and Qualification Criteria, requirement 2.1			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and US\$ equivalent)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: _____ <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: _____ <i>[insert full name]</i> Address of Employer: _____ <i>[insert street/city/country]</i> Reason(s) for nonperformance: _____ <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>

Pending Litigation, in accordance with Section III, Evaluation and Qualification Criteria	
<input type="checkbox"/>	No pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3.
<input type="checkbox"/>	Pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3 as indicated below.

Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount (currency), USD Equivalent (exchange rate)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in dispute: _____ Party who initiated the dispute: _____ Status of dispute: _____	
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute: Party who initiated the dispute: Status of dispute:	
Litigation History in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4. <input type="checkbox"/> Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4 as indicated below.			
Year of award	Outcome as percentage of Net Worth	Contract Identification	Total Contract Amount (currency), USD Equivalent (exchange rate)

<i>[insert year]</i>	<i>[insert percentage]</i>	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Matter in dispute: <i>[indicate main issues in dispute]</i> Party who initiated the dispute: <i>[indicate “Employer” or “Contractor”]</i> Reason(s) for Litigation and award decision <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
----------------------	----------------------------	---	------------------------

Form CON – 3:

Environmental and Social Performance Declaration

[The following table shall be filled in for the Bidder, each member of a Joint Venture and each Specialized Subcontractor]

Bidder's Name: *[insert full name]*

Date: *[insert day, month, year]*

Joint Venture Member's or Specialized Subcontractor's Name: *[insert full name]*

OCB No. and title: *[insert OCB number as per procurement plan]*

Page *[insert page number]* of *[insert total number]* pages

Name of the Reporting Firm _____

Environmental and Social Performance Declaration of the Reporting Firm

Environmental and Social Performance Declaration in accordance with Section III, Qualification Criteria, and Requirements			
<input type="checkbox"/> No suspension or termination of contract: An employer has not suspended or terminated a contract and/or called the performance security for a contract for reasons related to Environmental, or Social (ES) performance since the date specified in Section III, Qualification Criteria, and Requirements, Sub-Factor 2.5.			
<input type="checkbox"/> Declaration of suspension or termination of contract: The following contract(s) has/have been suspended or terminated and/or Performance Security called by an employer(s) for reasons related to Environmental, or Social (ES) performance since the date specified in Section III, Qualification Criteria, and Requirements, Sub-Factor 2.5. Details are described below:			
Year	Suspended or terminated portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and US\$ equivalent)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for suspension or termination: <i>[indicate main reason(s) e.g. for gender-based violence; sexual exploitation or sexual abuse breaches]</i>	<i>[insert amount]</i>
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i>	<i>[insert amount]</i>

		Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for suspension or termination: <i>[indicate main reason(s)]</i>	
...	...	<i>[list all applicable contracts]</i>	...
Performance Security called by an employer(s) for reasons related to ES performance			
Year	Contract Identification		Total Contract Amount (current value, currency, exchange rate and US\$ equivalent)
<i>[insert year]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for calling of performance security: <i>[indicate main reason(s) e.g. for gender-based violence; sexual exploitation, or sexual abuse breaches]</i>		<i>[insert amount]</i>

Form CCC: Current Contract Commitments / Works in Progress

[The form shall be filled in for the Bidder, and each member of a Joint Venture, if Bidder is a JV]

Bidder's Name: _____

Date: _____

JV Member's Name _____

OCB No. and title: _____

Page _____ of _____ pages

Name of Reporting Firm: _____

Current Contract Commitments / Works in Progress of the Reporting Firm

Bidders and each member of a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued. Based on value of all outstanding works and average monthly invoicing, the Bidder and each Member to a JV shall explain how completion by estimated time is proposed to be achieved for each contract listed. The Bidder and each Member to a JV shall also demonstrate based on access to, or availability of, financial resources such as liquid assets, unencumbered real assets, lines of credit, and other financial means, other than any contractual advance payments consistent with information provided by the Bidder/Each JV Member under Forms FIN--3.1, FIN 3.3 and this Form CCC how the overall cash flow requirements for this Contract and their all other current contract commitments will be met.

Current Contract Commitments and Cash-Flow Requirements

1 S. No.	2 Name of Contract	3 Employer's Contact Address, Tel, Fax	4 Value of Outstanding Work [Current US\$ Equivalent]	5 Estimated Completion Date/Time in Months to complete	6 Average Monthly Invoicing Over Last Six Months [US\$/month]	7 Estimated Cash-Flow Required for every 4 months= [Value under column 4 divided by Months under column 5 times 4]

Explanation: _____

Name of contract	Employer, contact address/tel. /fax	Value of outstanding work (current US\$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US\$/month)
1.				
2.				

3.				
4.				
5.				
etc.				

Form FIN – 3.1: Financial Situation and Performance

[The form shall be filled in for the Bidder, and each member of a Joint Venture, if Bidder is a JV]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

OCB No. and title: _____

Page _____ of _____ pages

Name of the Reporting Firm _____

Financial Situation and Performance of the Reporting Firm

1. Financial data

Type of Financial information in (currency)	Historic information for previous _____ years, _____ (amount in currency, currency, exchange rate, USD equivalent)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

2. Sources of Finance

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

No.	Source of finance	Amount (US\$ equivalent)
1		
2		
3		

3. Financial documents

The Bidder and its parties shall provide copies of financial statements for _____ years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.2. The financial statements shall:

- (a) reflect the financial situation of the Bidder or in case of JV member, and not an affiliated entity (such as parent company or group member).
 - (b) be independently audited or certified in accordance with local legislation.
 - (c) be complete, including all notes to the financial statements.
 - (d) correspond to accounting periods already completed and audited.
- ☐ Attached are copies of financial statements¹⁵ for the _____ years required above; and complying with the requirements

¹⁵ If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

Form FIN - 3.2: Average Annual Construction Turnover

[The form shall be filled in for the Bidder, and each member of a Joint Venture, if Bidder is a JV]

Bidder's Name: _____
 Date: _____
 Joint Venture Member's Name _____
 OCB No. and title: _____
 Page _____ of _____ pages

Name of the Reporting Firm _____

Average Annual Construction Turnover of the Reporting Firm

		Annual turnover data (construction only)	
Year	Amount Currency	Exchange rate	USD equivalent
<i>[indicate year]</i>	<i>[insert amount and indicate currency]</i>		
Average Annual Construction Turnover *			

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

Form FIN - 3.3: Financial Resources

[The form shall be filled in for the Bidder, and each member of a Joint Venture, if Bidder is a JV]

Bidder's Name: _____

Date: _____

JV Member's Name _____

OCB No. and title: _____

Page _____ of _____ pages

Name of Reporting Firm: _____

Financial Resources of the Reporting Firm

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as specified in Section III, Evaluation and Qualification Criteria consistent with the information provided under Form CCC.

Source of financing	Amount (US\$ equivalent)
1.	
2.	
3.	
4.	

Form EXP - 4.1: General Construction Experience

[The form shall be filled in for the Bidder, and each member of a Joint Venture, if Bidder is a JV]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

OCBI/LCB No. and title: _____

Page _____ of _____ pages

Name of the Reporting Firm _____

General Construction Experience of the Reporting Firm

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

Form EXP - 4.2(a)

Specific Construction and Contract Management Experience

[The form shall be filled in for the Bidder, and each member of a Joint Venture, if Bidder is a JV and Specialized Contractor, if applicable]

Bidder's Name: _____

Date: _____

JV Member's Name if the Bidder is a JV _____

Specialized Subcontractor's Name *[Insert full name if permitted]*

OCB No. and title: _____

Page _____ of _____ pages

Name of the Reporting Firm _____

Specific Construction and Contract Management Experience of the Reporting Firm

Similar Contract No.	Information
Contract Identification	<i>[insert contract name and number, if applicable]</i>
Name of the firm that was awarded the contract identified above	
Award date	<i>[insert day, month, year, e.g., 15 June 2016]</i>
Completion date**	<i>[insert day, month, year, e.g., 03 May 2018]</i>

<p>Role in Contract identified above [check the appropriate box. Check box as “Prime Contractor” if contract was awarded to the reporting firm as a single construction contractor. Check Box “Member in JV” if the contract was awarded to a JV and was a member of the JV. Check Box “Management Contractor” if the reporting firm signed the construction contract and was responsible for its performance and completion of works as per terms and conditions of the contract. Also see *** below. Check Box “Sub-Contractor” if the reporting firm was a sub-contractor appointed by the main contractor who was awarded the contract]</p>	<p>Prime Contractor <input type="checkbox"/></p>	<p>Member in JV <input type="checkbox"/></p>	<p>Manag. Contractor <input type="checkbox"/>***</p>	<p>Sub-contractor <input type="checkbox"/></p>
<p>Total Contract Amount</p>	<p>[insert total contract amount in local currency]</p>		<p>US\$ [insert Exchange rate and total contract amount in US\$ equivalent]*</p>	
<p>If reporting firm was a member in a “JV” or “sub-contractor”, as per box checked above, it can claim experience only for its’ own share of works actually performed under the contract and not the entire contract. As such, the reporting firm shall indicate its share as a percentage of the total Contract amount and also in absolute amount</p>	<p>[insert the percentage of the total contract amount indicated above which represents reporting firm’s share under the contract performed]</p>	<p>[insert amount the reporting firm received or entitled to for the works performed as its share in the total contract amount in local currency]</p>	<p>[insert exchange rate and total contract amount in US\$ equivalent]*</p>	
<p>Roles and Responsibilities</p>	<p>[Briefly describe roles and responsibilities of the Reporting firm under the above contract]</p>			

Employer's Name:	<i>[Insert Full Name]</i>
Address:	<i>[indicate street / number / town or city / country]</i>
Telephone/fax number	<i>[insert telephone/fax numbers, including country and city area codes]</i>
E-mail:	<i>[insert e-mail address, if available]</i>

- * Refer Section III for guidance on the date and source of exchange rate.
- ** If contract is not fully completed but substantially completed then indicate the absolute total value of the completed part of the contract and also the percentage completion calculated as a percentage of the total value of the contract upon completion.
- *** In claiming experience as a Management Contractor, the Bidder shall furnish copies of the contracts signed by the Bidder demonstrating scope of construction works performed. It should be noted that a Construction Manager is not the same as a Management Contractor. Construction Manager is a Consultant for or agent of the Borrower and mainly responsible for supervision of the construction works and does not take the risks associated with the performance of the construction contracts as the Management Contractor does. Instead of performing the works directly, a Management Contractor contracts out and manages the work of other contractors taking on full responsibility and risk for price, quality and timely performance as per the terms and conditions of contracts it signs with the Employers.

Form EXP - 4.2(a) (cont.)
Specific Construction and Contract Management
Experience (cont.)

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

Form EXP - 4.2(b): Construction Experience in Key Activities

[The form shall be filled in for the Bidder, and each member of a Joint Venture, if Bidder is a JV and Specialized Contractor, if applicable]

Bidder's Name: _____
 Date: _____
 Joint Venture Member's Name _____
 Subcontractor's Name¹⁶ (as per ITB 34.2 and 34_3): _____
 OCBI No. and title: _____
 Page _____ of _____ pages

Name of the Reporting Firm _____

Construction Experience in Key Activities of the Reporting Firm under each contract completed or under implementation

Bidder, Members of the JV or proposed Specialized Contractors claiming experience for key activities must complete the information in this form as per ITB 34.2 and 34.3 and Section III, Qualification Criteria and Requirements, Sub-Factor 4.2. *[Provide information for each contract separately when claiming experience by aggregating quantities of the key activity completed in more than one contract]*

1. Key Activity No One: _____

	Information			
Contract Identification				
Award date				
Completion date as per Contract				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub-contractor <input type="checkbox"/>
Total Contract Amount			US\$	
Description of the key activities in accordance with Sub-Factor 4.2(b) of Section III:	Information			

¹⁶ If applicable.

	<i>[insert response to Employer's inquiry indicated in left column]</i>		
<p>Quantity (Volume, number or rate of production, as applicable for the key activity) performed under the contract per year or part of the year. For each year indicate quantities performed and specify both start and end months.</p> <p><i>[Insert extent of participation indicating actual quantity of key activity successfully completed in the role performed]</i></p>	<p>Total quantity in the contract (i)</p>	<p>Percentage participation (ii)</p>	<p>Actual Quantity Performed (i) x (ii)</p>
Year 1 <i>[e.g. 2017 from January to September]</i>			
Year 2 <i>[e.g. 2018 from January to December]</i>			
Year 3			
Year 4			
Year 5			
<p>In response to the criterion for rates of production in 12 consecutive months or less, if performance under more than one contract spread over more than one year are considered, the Applicant shall provide information by months for each such contract to demonstrate which same 12 consecutive months meet the minimum rate of production.</p>			
Employer's Name:			
Address:			
Telephone/fax number			
E-mail:			

	Information
Employer's Name:	
Address:	
Telephone/fax number	
E-mail:	

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

2. Activity No. Two

3.

Form EXP - 4.2(c): Specific Experience in Managing ES aspects

[The form shall be filled in for the Bidder, and each member of a Joint Venture, if Bidder is a JV and Specialized Contractor, if applicable]

Bidder's Name: _____
 Date _____
 Joint Venture Member's Name _____
 OCBI no and title: _____
 Page _____ of _____ pages

1. Key Requirement no 1 in accordance with 4.2 (c): _____

Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Subcontractor <input type="checkbox"/>
Total Contract Amount			US\$	
Details of relevant experience				

2. Key Requirement no 2 in accordance with 4.2 (c): _____

3. Key Requirement no 3 in accordance with 4.2 (c): _____

4. ...

Section V - Eligible Countries

Eligibility for the Provision of Goods, Works and Services in Bank-Financed Procurement

A. Provisions under Section 5 “Eligibility” of the Procurement Policy for Bank Group Funded Operations and Chapter A of Volume 1 of the Operations Procurement Manual under Procurement Framework of the African Development Bank

The African Development Fund permits firms and individuals from all countries to offer goods, works and services for ADF funded projects. However, the proceeds of any Financing undertaken in the operations of the African Development Bank and the Nigeria Trust Fund shall be used for procurement of goods and works, including the related services, provided by bidders from Eligible¹⁷ Countries.¹⁸ Any conditions for participation shall be limited to those that are essential to ensure the firm’s capability to fulfill the contract in question. In the case of ADB and NTF, bidders from non-Member Countries offering goods, works and related services (including transportation and insurance) are not eligible even if they offer these from Eligible Member Countries. Any waiver to this rule will be in accordance with the Articles 17(1) (d) of the Agreement Establishing the African Development Bank and 4.1 of the Agreement Establishing the Nigeria Trust Fund.

B. Rules and Procedures for Procurement of Goods and Works

Overview

The eligibility criteria for participation in the supply of goods, works and related services, to be procured through the ADB and NTF Financing, derive from the requirements of the Agreement Establishing the African Development Bank, Article 17.1.d, and the Agreement Establishing the Nigeria Trust Fund, Article 4.1. The foregoing requirements basically prescribe two types of eligibility criteria:

1. The eligibility of the bidder;
2. The eligibility of the goods, works and related services.

¹⁷ Refer to Bank Procurement Framework for additional information on Eligibility.

¹⁸ “Eligible Countries” shall mean: (a) in the case of the African Development Bank and the Nigeria trust Fund, the Member Countries of the African Development Bank; and (b) in the case of the African Development Fund, any country.

Eligibility of the Bidder

The eligibility of the bidder shall be based on nationality, in accordance with the following rules:

- (a) Natural Persons: A natural person is eligible if he or she is a national of a Member Country of the Bank, or a State Participant of the Fund. Where a person has more than one nationality, such a person shall be eligible if the nationality indicated in his or her bid is that of a Member Country of the Bank, or a State Participant of the Fund.
- (b) Corporations: A corporation is eligible if it satisfies the following criteria:
 - 1. it is incorporated in a country that is a Member of the Bank, or State Participant of the Fund;
 - 2. it is a national of a country that is a Member of the Bank, or State Participant of the Fund, as determined by the law of its place of incorporation;
 - 3. it has its principal place of business in a country that is a Member of the Bank, or State Participant of the Fund.
- (d) Joint Ventures and Associations: An unincorporated joint venture, partnership, or association, shall be eligible if more than 50% of the value of its works and/or services is executed by its members satisfying the eligibility requirements for individuals or corporations.

Eligibility of the Goods, Works and Related Services

In order to be eligible, the goods to be procured must have been mined, grown, or produced, in the form in which they are purchased, in an Eligible Member Country.

For works contracts, which may include civil works, plant construction, or turnkey contracts, the contractor must satisfy the nationality criteria of eligibility, either as a natural person, or corporation, or joint venture and association. Labour, equipment, and materials needed for carrying out the works contract, shall be supplied from Eligible Member Countries.

For contracts, which have been awarded on the basis of Cost, Insurance and Freight (CIF), or Carriage and Insurance Paid (CIP), bidders shall be free to arrange for ocean and other transportation, and the related insurance, from any Eligible Member Country. On the other hand, where goods are shipped on FOB basis, and the Bank has agreed to finance transportation and insurance separately, which are arranged by the purchaser, under a separate contract, the Bank shall be satisfied that the services are supplied from Eligible Member Countries.

List of Eligible Countries

List of Eligible countries can be found in African Development Bank's website:

<https://www.afdb.org/en/about-us/corporate-information/members/>

Section VI - Fraud and Corruption

(Section VI shall not be modified)

1. Purpose

1.1 The Bank's Integrity Framework and this annex apply with respect to procurement under Bank Investment Project Financing operations.

2. Requirements

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

- a. Defines, for the purposes of this provision, the terms set forth below as follows:
 - i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
 - ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;
 - iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - v. "obstructive practice" is:
 - (a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank 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; or
 - (b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.
- b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants,

sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;

- c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring misprocurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
- d. Pursuant to the Bank's Integrity Framework and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;¹⁹ (ii) to be a nominated²⁰ sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;
- e. Requires that a clause be included in bidding documents and in contracts financed by a Bank loan, requiring (i) bidders (applicants), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect²¹ all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the Bank.

¹⁹ For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

²⁰ A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

²¹ Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

Part 2: Works' Requirements

Section VII - Works' Requirements

Table of Contents

Technical Specifications	118
List of Goods and Related Services	158
Delivery and Completion Schedule	121
Environmental and Social Requirements	158
Key Personnel	1625
Drawings	126
Supplementary Information	127

Technical Specifications

Volume 2: Requirements: Scope of Works and Specifications

Lot 5 – Sanitation Interventions in Nairobi Informal Settlements

Contents

SPECIFICATIONS BACKGROUND

The specifications outlined hereunder have been adopted from the following BS-EN, Kenyan Standards (KS), Codes of Practice and Design Manuals:

- Ministry of Water and Irrigation – Practice Manual for Water Supply services in Kenya, October 2006.
- Water Supply – ACT wort et al – 5th Edition
- Basic Water Treatment for application Worldwide – George Smethrust, 1979
- Water and Wastewater Engineering, Volume 1 & 2 – Gordon M. Fair; John C. Geyer; Daniel A. Okun
- Water and Wastewater Technology - Mark J. Hammer and Mark J. Hammer Jr. – 4th Edition
- BS 3505 – Specifications for uPVC pressure pipes for Cold Portable Water.
- BS 3601/AWWA 200 – Specification of Steel Pipes and tubes for Pressure purposes
- KS 06-149 Part 2 – Specification for uPVC Water Pressure Pipes
- WHO Report No. 4 – Selection and Design Criteria for Community Water Supply Projects
- BS 3601 – Specification for Steel Pipes and Tubes for Pressure purposes

The references are used in a complementary manner. Where requirements of two or more codes or standards are found to conflict, the more stringent of them is adopted for the purpose of this project.

As a result, the specifications have been developed, refined, revised and compiled over the years by Howard Humphreys' Design teams. Focus has been on usage of the this specifications in similar projects over the last 20 years which has resulted in sound projects that meet the unique requirements of various Clients. The design life of the various project have been exceeded. The methods have been; application of the codes, feedback form results achieved and improvement.

The Consultant's experience is that strict adherence of the outlined specifications will result in better workmanship and sound implemented systems.

Whenever reference is made to "The Engineer" (or "The Resident Engineer") or "The Engineer's Representative" in the specifications, it shall be construed to mean "The Project Manager" or "The Project Manager's Representative" respectively.

TECHNICAL SPECIFICATIONS

LIST OF CLAUSES

SECTION 1	GENERAL REQUIREMENTS	10
101	Project Background.....	10
101.1	The Project Area.....	10
101.1.1	Location	10
101.1.2	Topography	10
101.1.3	Climate.....	11
101.1.4	Geological and Sub-soil Conditions	11
101.2	Existing Socio-Economic Infrastructure	11
101.2.1	Demographics	11
101.2.2	Health Access	11
101.2.3	Education	12
101.3	Existing Water Supply Infrastructure.....	12
101.4	Existing Wastewater Infrastructure	13
101.5	PROJECT COMPONENTS	15
102	Quality and Approvals.....	16
103	Construction Documents	16
104	Operation and Maintenance Manuals	17
105	Level Datum	17
106	Setting Out of the Works.....	17
107	Boundaries of Works.....	18
108	Work through Private Land	18
109	Public Utility Mains and Services	18
110	Safeguards to Existing Pipes, Cables, Structures.....	19
111	Record Drawings.....	19
112	Connections to Existing Pipes, Cables and Equipment	19
113	Lighting, Watching and Traffic Control	19
114	Contractor's Offices	20
115	Project Manager's Office.....	20
116	Vehicles for the Project Manager	22
117	Contractor's Yards, Stores and Accommodation for Workmen	22
118	Water and Electricity Supplies	23
119	Contractor's Staff and Workmen.....	23
120	Training of Employers Workmen.....	23
121	Project Management.....	23
121.2	Monthly Statements and Certificates	24
121.3	Progress Meetings.....	24
122	Equipment for the Employer	25
123	Facilities for Survey and Inspection by the Project Manager	25
124	Inspections by the Project Manager during Defects Liability Period	25
125	Protective Clothing and Safety Equipment.....	25
126	Notice Boards	25
127	Language of Correspondence and Records	26
128	Standards and Regulations.....	26

129	Equivalency of Standards and Codes	26
130	Quality Control.....	26
131	Units	26
132	Inspection and Testing during Manufacture	26

SECTION 2 EARTHWORKS, BACKFILLING AND RESTORATION 28

201	Conditions of Site	28
202	Site Clearance and Topsoil Removal.....	28
203	Erosion	28
204	Ground Levels	29
205	Trial Holes	29
206	Excavation Generally	29
207	Excavation in Excess	29
208	Mechanical Excavation	30
209	Excavation for Pipelaying	30
210	Headings	30
211	Excavation for Foundations of Structures	30
212	Rock Surfaces under Concrete Structures	31
212.1	Concrete Placed Directly on Rock.....	31
212.2	Concrete Placed on Capping Layer.....	31
213	Explosives	31
214	Excavated Materials Suitable for Re-use.....	32
215	Backfilling of Excavations	32
216	Pipe Beddings	32
217	Compaction Fraction Test.....	34
217.1	Apparatus required:	34
218	Selected Backfill Material	34
219	Backfilling of Pipe Trenches	34
220	Making Good Subsidence after Backfilling.....	35
221	Removal of Timbering from Excavations	35
222	Reinstatement of Surfaces	35
223	Safety of Excavations in Roads	36
224	Temporary Reinstatement of Asphalted Roads	37
225	Temporary Reinstatement of Unmade Roads	37
226	Permanent Reinstatement of Asphaltic Roads	38
227	Forming Banks and Filled Areas	38
228	Restoration of Borrow Areas, Spoil Tips and Quarries	38
229	Top soiling and Grassing	38
230	Free Draining Fill	38
231	Hardcore	39

SECTION 3. CONCRETE WORKS – GENERAL 40

301.	Scope	40
302	Concrete.....	40
Table 3.1 Minimum Cement Contents.....		41
302.2	Strength.....	42
302.3	Mixes	42
302.4	Quality Control	43
302.5	Production.....	44

302.6	Cement.....	47
302.7	Aggregates	48
302.8	Water	50
302.9	Admixtures	51
302.10	Control of Alkali-Silica Reaction	51
303	Reinforcement.....	51
303.2	Storage.....	52
303.3	Bending and Fixing	52
303.4	Couplers.....	53
304	Formwork 53	
304.2	Sawn Formwork	55
304.3	Wrought Formwork	55
304.4	Special Wrought Formwork	55
304.5	Tolerances.....	55
304.6	Striking and Removal	55
305	Concreting 57	
305.2	Transporting	57
305.3	Placing and Compaction.....	57
	STRUCTURAL CONCRETE APPROVAL FORM (SCAF)	59
305.4	Concreting in Deep Lifts.....	60
305.5	Continuous Concreting	61
305.6	Hot Weather Concreting (for temperatures above 20 Degrees Centigrade).....	62
305.7	Wet Weather Concreting	63
305.8	Holes, Cavities and Fixings	63
305.9	Protection and Curing.....	63
305.10	Joints.....	66
305.11	Finishes - General	69
306	Testing 71	
306.2	Loading Tests	72
307	Special Concrete.....	74
307.2	Air-Entrained Concrete.....	74
307.3	Concrete in Benching	74
307.4	Ready Mixed Concrete	74
307.5	Granolithic Concrete.....	76
307.6	Pneumatically Applied Mortar (Gunitite)	76
307.7	Cement Grouts	77
307.8	Pumped Concrete.....	78
308	Precast Concrete Units	78
308.2	Kerbs	79
308.3	Paving Slabs	79
308.4	Other Blocks	79
308.5	Wall Units.....	79
308.6	Other Items	79
309	Site Books And Standards	79
309.2	Site Diary	80
309.3	Copies of Standards and Codes	80
310	Water Retaining Structures - Special Clauses	80
310.1	Making Good.....	80
310.2	Construction Joints in Water Retaining Structures	80
310.3	Watertightness of Structures	81
310.4	Hydrophilic Rubber Sealer	81

310.5	Waterproof Membranes for Concrete Roofs and Gutters	81
-------	---	----

SECTION 4 PIPELINES, PIPEWORK 82

401	General	82
401.2	Materials	82
401.3	Approval	82
401.4	Dimensions	82
401.5	Packaging and Protections	83
401.6	Marking	83
401.7	Receipt, Storage, Handling and Transportation	83
401.8	Manufacturer's Certificates	83
401.9	Proprietary Materials	83
401.10	Rejected Materials	84
402	Samples and Storage of Materials	84
403	Flanges	84
404	Mechanical Couplings	84
405	Materials for the Assembly of Flexible Joints	85
406	Ductile Iron Pipes	85
406.2	Corrosion Protection	85
407	Galvanised Steel Pipes.....	85
408	Steel Pipes	85
408.2	Corrosion Protection	85
409	Glass Reinforced Plastic (GRP) Pipes and Fittings	86
410	uPVC Sewers and Pressure Pipes and Fittings	86
411	Concrete Pipes, Bends and Junctions	86
412	HDPE Pipes and Fittings	87
412.2	Compound Material	87
412.3	Identification compound	87
412.4	General appearance.....	88
412.5	Color	88
412.6	Dimensions	88
412.7	Markings.....	88
412.8	Jointing of Pipes	89
412.1	General	89
412.2	Joints.....	89
413	Gate Valves	90
413.2	Wedge Gate Valves for Manual Operation.....	90
414	Butterfly Valves.....	91
414.2	Construction	91
414.3	Valve Performance	91
414.4	Testing	92
415	Air Valves	92
416	Non-Return Valves	92
416.2	Nozzle Check Valves.....	92
417	Flow Control Valves.....	92
418	Pressure Reducing Valves	93
419	Ball Float Valves.....	93
420	Constant Flow Valves.....	93
421	Surface Boxes and Chamber Covers	93
422	Gully Gratings and Frames	94

423	Manhole Safety Chains.....	94
424	Manhole and Chamber Access Covers	94
425	Manhole Step Irons.....	95

SECTION 4B. PIPELINE CONSTRUCTION 96

426	General	96
427	Topographic Surveys	96
428	Handling and Transport of Pipes and Fittings	96
429	Stringing and Examination of Pipes Prior to Laying	97
430	Laying Pipes	98
430.1	Embedment and Compaction.....	98
430.2	Pipes Laid in Trench.....	99
430.3	Pipe Bedding and Surround	99
430.4	Pipes Laid Above Ground	99
431	Cutting Pipes	100
432	Proprietary Joints and Couplings	100
433	Flanged Joints	101
434	Steel Pipelines Welded Joints	101
435	Fixing Valves and Penstocks	101
436	Thrust and Anchor Blocks	102
437	Concrete Surround to Pipes	102
438	Flotation of Pipelines	102
439	Pressure Rating	102
440	Testing of Water Supply Pipelines	102
441	Cleansing and Sterilizing of Pipelines	103
442	Painting	105
443	Connections to and Diversions to Existing Pipework.....	105
443.2	Materials	105
443.3	Personnel	106
443.4	Preliminary Work	106
443.5	Carrying out the Work.....	106
443.6	Water Pipes and Chambers to be abandoned.....	106

SECTION 4C. DRAINS, SEWERS AND MANHOLES..... 107

444.	Excavation for Drains, Sewers and Manholes	107
445.	Supports for Pits, Trenches and Other Excavations.....	107
446.	Rock Cutting in Trenches for Pipes.....	107
447.	Water in Trenches for Pipelines	107
448.	Laying and Jointing Rigid Jointed Concrete Pipes	108
449.	Pipes Laid with Open Joints	108
450.	Drains to be Left Clean on Completion	108
451.	Refilling Trenches	108
452.	Connections of Existing Sewers and Drains	109
453.	Manholes and Inspection Chambers	109
454.	Precast Concrete Manholes	109
455.	Gully Connections	109
456.	Surface Boxes, Covers Etc.	110
457.	Gullies	110
458.	Completion of Drainage Works.....	110

459. Temporary Stoppers	110
460. Provision for Future Connection to Manholes.....	110
461. Surrounding or Haunching of Pipes with Concrete	110
462. Invert Block and Stone-Pitched Drains	110
463. Testing of Jointed Pipes and Manholes	111
464. Pipes with Rubber Ring Joints.....	111
465 Laying, Jointing and Backfilling for Flexible Jointed Pipes.....	111
Flexible Rubber Ring Joints	112
Expansion Gap	112
Solvent Cement Joints	112

SECTION 5. BUILDING AND STRUCTURES..... 113

501 Concrete Building Blocks.....	113
502 Laying Building Blocks.....	113
503 Precast Concrete Units Generally	113
504 Masonry Using Natural Irregular Stones	113
505 Screen Walling	113
506 Damp-Proof Course.....	114
507 Damp-Proof Membrane.....	114
508 Composition of Mortars.....	114
509 Mixing of Mortars	114
510 Cement Rendering.....	115
511 Tanking to Buried Concrete Surfaces.....	115
512 Waterproof Rendering	115
513 Grouting in Ironwork.....	115
514 Cable Duct Covers and Frames	116
514.2 Checker Plate Covers.....	116
515 Fences and Gates	116
516 Joint Sealing Compound and Sealants.....	116
517 Openings in Walls, Floors and Ceilings	117
518 Structural Steelwork	117
519 Open Mesh Walkways and Covers.....	117
520 Handrailing 118	
521 Guardrail 118	
522 Chains 118	
523 Steel Access Covers	118
524 Isolation of Aluminum.....	118
525 Galvanising 118	
526 Fixings to Structure, etc.....	119

SECTION 6. ROADS AND SURFACING..... 120

601 Access Tracks	120
602 Access Roads.....	120
602.1 Macadam Roads and Macadam Hardstandings	120
602.2 Unsurfaced Roads and Hardstandings	121
602.3 Pea Shingle Surfaced Areas.....	121
603 Precast Concrete Kerbs and Channels	121
604 Precast Concreting Edging.....	122
605 Footpaths and Paving.....	122

606 Laying to Grade	122
---------------------------	-----

SECTION 7 SAFETY, HEALTH AND ENVIRONMENT 123

701 Introduction	123
702 Compliance with Specifications	123
703 Failure to Comply with Specifications.....	124
704 General Requirements	125
Safety Officer	125
Safety Training	126
Safety Meetings	126
Safety Inspections.....	126
Control of Substances Hazardous to Health	126
Potential Hazards.....	126
Accident Reporting.....	126
Notices, Signs, Etc.....	127
First Aid and Medical Attention.....	127
Employee Qualification and Conduct.....	127
705 Safety Requirements	128
Fire Protection and Prevention	128
Electrical Safety.....	129
Oxygen/Acetylene/Fuel Gases/Cartridge Tools	130
Scaffolding/Temporary Works	130
Use of Ladders.....	131
Elevated Work.....	131
• 705.7.1 Roofing and Sheet Metal Laying	132
• 705.7.2 Erection of Structures	132
• 705.7.3 Mobile Elevating Work Platforms.....	132
□□□ 705.7.4 Hoists	132
• 705.7.5 Suspended Cradles.....	132
Use of Temporary Equipment	132
Cranes:.....	133
Locking-out, Isolating and Tagging Equipment.	134
Installation of Temporary or Permanent Equipment.....	134
Laser Survey Instruments	134
Working in Confined Spaces.....	134
Demolition.....	135
Use of Explosives.....	135
Excavation and Trenching	136
Concrete Reinforcement Starter Bars	136
706 Environmental and Health Requirements	137
706.1.1 Policy	137
706.1.2 Planning	137
706.1.3 Implementation and Operation	137
706.2 Protection of the Environment.....	138
706.3 Air Pollution	138
706.3 Water Pollution.....	138
706.4 Solid Waste.....	138
706.4.2 Rubbish Removal and Disposal.....	139
706.4.3 Asbestos Handling and Removal.....	139
706.4.4 Pest Control	139

706.5	Noise Control.....	139
707	Additional Requirements for Work in Public Areas	140
	Method Statement.....	140
	Closure of Roads, Etc.	141
	Trench and Other Excavations	141
	Safety Barriers	142
SECTION 8	CONTRACTOR’S SITE CHECK LIST	143
801	Contractor’s Site Check List.....	143
802	Construction Environmental Management Plan	152
	Abbreviations	157

SECTION 1 GENERAL REQUIREMENTS

101 Project Background

101.1 The Project Area

101.1.1 Location

The project location is Nairobi City, the administrative and commercial capital of the Republic of Kenya and seat of the Government.

The city is located at latitude 1°17' south and longitude 36°49' east and occupies around 696 km². It is situated about 1660 meters (5450 feet) above sea level.

Nairobi borders Thika and Kiambu to the North, Machakos to the East and Kajiado to the South. It is situated between the cities of Kampala and Mombasa. It is close to the Rift Valley. The Ngong hills are towards the west, Mount Kenya is towards the North and Mount Kilimanjaro is towards the south-east. The three major rivers traversing Nairobi include the Nairobi River, Ngong River and Mathare River. Uhuru Park, Central Park, City Park and Nairobi Arboretum are among several parks of Nairobi. The indigenous Karura forest is in northern Nairobi.



Figure 1: Administrative Boundary of the City of Nairobi Showing Project Areas

101.1.2 Topography

The terrain in the eastern side of the County is gently rolling but divided by steep valleys towards the City boundaries. To the north, there is the Karura forest which is characterized by steep sided valleys. The Karen - Langata area is characterized by plains surrounded by Nairobi National Park on the east and Ngong Forest on the south.

Several streams with steep-sided valleys covered with vegetation are a dominant landscape feature of the County. The main rivers in the County are Nairobi River, Ngong River and Kabuthi River. These rivers are highly polluted as open sewers and industrial waste is directed towards them. Nairobi dam,

which is along the Ngong River, and Jamhuri dam are the main water reservoirs in the County. The main types of soils are the black cotton and the red soils that form patches in different parts of the County.

There are three forests in the County namely Ngong Forest to the south, Karura Forest to the north and the Nairobi Arboretum. The three forests have a total coverage of 23.19 km².

101.1.3 Climate

The County has a fairly cool climate resulting from its high altitude. Temperature ranges from a low of 10°C to a high of 29°C. It has a bi-modal rainfall pattern. The long rains season fall between March and May with a mean rainfall of 899 millimetres (mm) while the short rains season falls between October and December with a mean rainfall of 638 mm. The mean annual rainfall is 786.5 mm.

101.1.4 Geological and Sub-soil Conditions

The Study Area is overlain with an ancient core of crystalline rocks of the Basement Complex which underlies the greater part of the plateau areas of Africa which have been affected by the extensive faulting, displacement and volcanic activity associated with the Rift Valley System. The eroded surface of the pre-Cambrian basement rocks outcrops only on the southern and eastern margins of the area. Elsewhere it is overlain by a variable thickness of volcanic and pyroclastic rocks of Tertiary age.

The Tertiary succession comprises various lava flows, pyroclastic rocks or their weathered derivatives, and also palaeosols, developed intervening periods sub-aerial weathering. Upthrusting and concentration of volcanic activity at the margins of Rift Valley has resulted in a general alignment of lava flows and associated deposits in a southeasterly direction. The sporadic character of the volcanic events both in space and time has dictated the lateral and vertical variability of geological succession.

101.2 Existing Socio-Economic Infrastructure

101.2.1 Demographics

Table 1 below shows proposed project areas various administrative divisions, their population and population densities as per the 2019 Kenya Population and Housing Census (KPHC) report.

Table 1: Demographic details of administrative areas within the project area (2019)

	MALE	FEMALE	TOTAL	HOUSEHOLDS	AREA (km ²)	DENSITY PERSONS PER KM ²)
DAGORETTI	217,651	216,526	434,177	155,089	29	14,908
EMBAKASI	492,476	496,270	988,746	347,955	86	11,460
KAMUKUNJI	136,670	131,599	268,269	84,365	11	25,455
KASARANI	381,234	399,385	780,619	271,290	86	9,063
KIBRA	94,199	91,569	185,768	61,690	12	15,311
LANG'ATA	96,698	100,774	197,472	62,239	217	911
MAKADARA	96,369	93,157	189,526	70,361	12	16,150
MATHARE	106,522	100,028	206,550	74,967	3	68,940
NJIRU	307,642	318,809	626,451	204,563	130	4,821
STAREHE	109,173	101,238	210,411	69,389	21	10,205
WESTLANDS	153,818	155,021	308,839	104,980	98	3,167
	2,192,452	2,204,376	4,396,828	1,506,888	704	6,245

101.2.2 Health Access

Kenyatta National Hospital is the major referral hospital in Nairobi. There are 16 sub- County hospitals, 9 mission, 32 private, 15 nursing homes, 38 public health centres as well as 45 private health centres.

The County has 30 public dispensaries, Private dispensaries, 84 private clinics and 22 public clinics. Kenyatta National Hospital has a total bed capacity of 1,800. Level 5 hospitals in the County have a bed capacity of 750. The doctor patient ratio stands at 1:7,816.

101.2.3 Education

The City of Nairobi is very vibrant on the education front. This is demonstrated by high concentration of tertiary and university level institutions with science and technology institutions being 237 as at 2012. It hosts the oldest public university in the country; The University of Nairobi, and 16 university colleges and campuses.

Whereas the city has a high concentration of national schools, it experiences huge challenges on accessing secondary education due to high competition for available vacancies both from within and without the County. Access to basic education at primary and secondary levels remains a major challenge to the urban poor especially in the informal settlements. Civil society organizations continue to play a key role in ensuring that pupils from non-formal settlements access basic education. The requirement for land in registration of public primary schools has been a big barrier to education accessibility since schools operating as community based organizations do not benefit from free primary education. There are 1,235 functional primary schools while the number of secondary schools is 319.

Additionally, there are currently 972,299 students in one form or another in Nairobi.

101.3 Existing Water Supply Infrastructure

The first recorded water source for Nairobi was commissioned in 1899, based on the Ngong River (Nairobi Dam) in the Athi catchment. This produced small quantities of poor quality water and was later abandoned.

During the period 1900 to 1906 the Kikuyu Springs located 18 km from the city were developed to produce approximately 4500 m³/day which was sufficient for Nairobi's needs until the late 1930's.

In 1938, the first phase of development of a source based on the Ruiru River- an intake weir and pipeline was completed. This source was further developed by commissioning a second pipeline in 1946, and a third pipeline then Ruiru Dam in 1949.

The next major source, Sasumua Dam was initially fed by Sasumua River, supplemented by water diverted from the head - waters of the Chania River. The Project included a water treatment plant works adjacent to the dam and a pipeline which deliver treated water to the terminal reservoir at Kabete in Nairobi. This project was completed in 1956. Subsequent developments have included raising the dam, diverting the Kiburu River into Sasumua and increasing the capacity of the treatment works, pipelines and terminal reservoirs.

When Sasumua yield was fully exploited, the next source of water which was developed is the Chania River, initially by pumping from the river at Ngethu, followed by a diversion dam, at Mwagu which transfers water to Ngethu treatment works by gravity via a three meter diameter tunnel and a 1400 mm pipeline. This project was completed in 1984. After completion of the Mwagu Diversion Dam, the associated tunnel and pipeline conveying raw water to Ngethu, the total available water to Nairobi was close to the demand. Then Thika Dam was developed and commissioned in 1994 to feed the Mwagu / Ngethu system.

The Northern Collector Phase 1 and Phase 2 were planned to be implemented in 2001 and 2006 respectively but the implementation of this project stalled, and was subsequently begun in 2015.

In the meantime, Nairobi is faced with chronic water shortage resulting to water rationing in most parts of the City.

101.4 Existing Wastewater Infrastructure

The existing sewer network comprises a trunk sewer system that has a total length of about 162.7 km and covers an area of about 208 km² which essentially covers only 40% of the city area served with water. The problems in the system are non-functional sewers due to washed away sections, accidental breakages or deliberate vandalism of manhole covers, blockages due to deliberate dumping of solid waste or accidental entry of stones and boulders into open manholes and also blockage of sewer lines by urban farmers to catch sewage for irrigation and overflowing of sewers due to insufficient capacity.

There are number of Sewage Treatment Plants within Nairobi, the main ones being the Dandora Estate STW, Kariobangi STW, Kahawa West STW and Karen STW. The DESTW has a design capacity of 160,000m³/day and handles an average flow of 73,255m³/day (Annex 1, Table A. 1 - 1). While the Kariobangi plant has a design capacity of 32,000m³/day and handles an average flow of 11,000m³/day, the plant is in the process of being rehabilitated and all its sewage is currently being diverted to the DESTW.

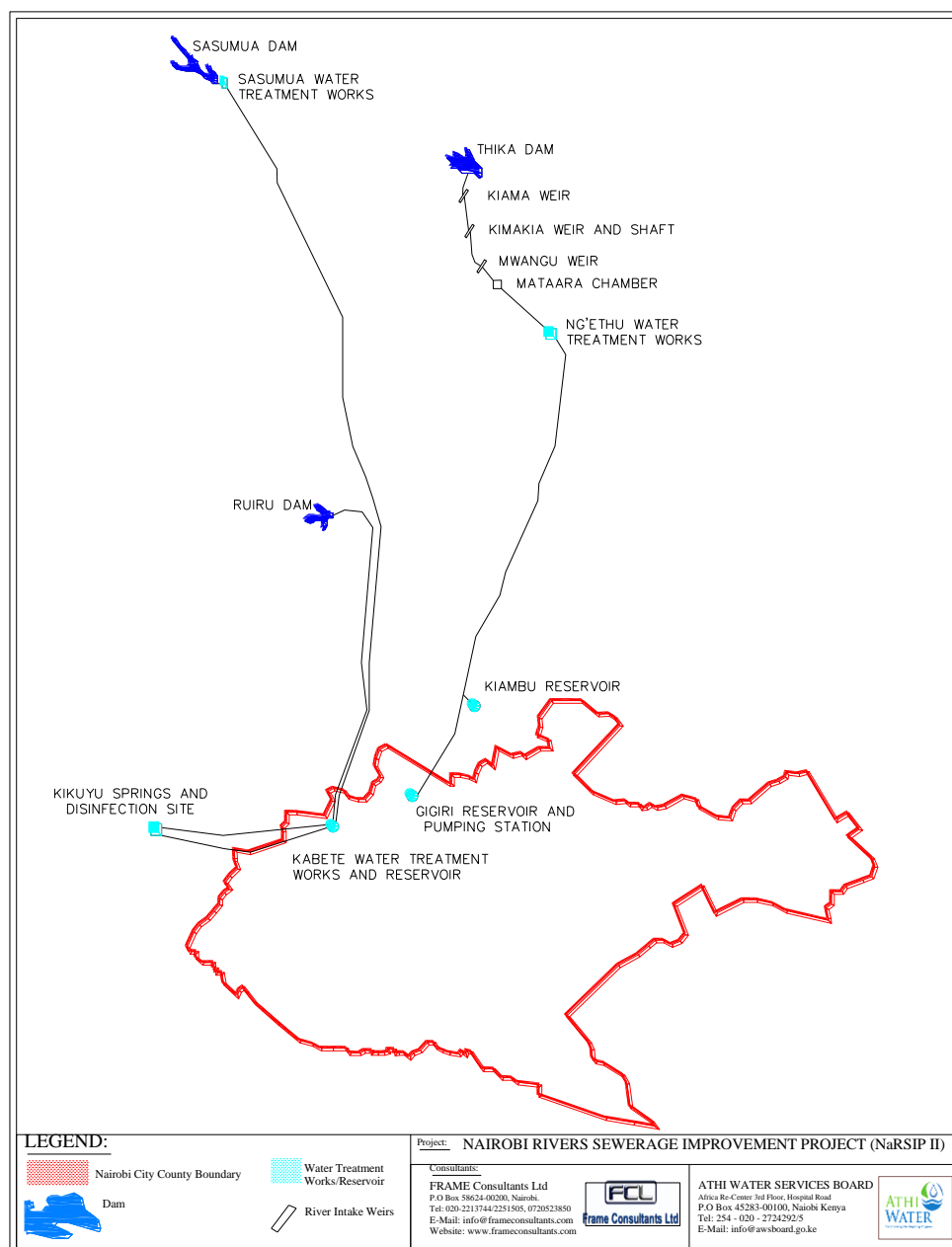


Figure 2: Existing Nairobi City Water Sources

The sewage treatment plants are operating at very low efficiency, despite the fact that they receive flows below their design capacity. Other treatment plants have broken down with the sewage having to be diverted to other treatment plants. It has been suggested that this may be attributed to poor maintenance, high organic loading and influence of industrial discharges.

Sanitation facilities other than the waterborne system described above in use in Nairobi include Septic Tanks and Pit Latrines.

The main areas that are served by septic tanks in Nairobi are mostly those that are not covered by the sewerage network or sewers have just been built. This includes Muthaiga, Lower Kabete, Karen, Githurai, Zimmerman, Kasarani, Garden Estate, Thome, Ridgeways, Runda, Ruaka, Utawala and Ruai.

Pit Latrines are in use in informal settlement areas of Kibera, Mathare and Mukuru.

101.5 Project Components

The Project Scope involves;

- a) **25** No. Ablution Blocks in the selected areas in table (1) below.
- b) 10 No. Pilot Fresh-life toilets in Mukuru
- c) 25 Km of Simplified sewers to achieve at least 700 No. last mile household connections . This includes 400 Household Connections for Type A, (Connection of Existing Water Borne On-site Sanitation Facilities to the Public Sewer Network (for plots with septic tanks, cess pits etc.) and 300 Household Connections for Type B (Upgrading of Existing Pit Latrines to a Water Borne System (Pour Flush/ Cistern) and Connection to the Sewer Network (for Plots with Pit latrines) in accordance with the Connections strategy
- d) 3 No. Boreholes complete with 3 No. elevated steel tanks ,24m³ capacity and 18 m high and water Kiosks and 50 km water distribution networks. The number of households proposed to be connected is 700 households to correspond to the targeted households proposed for the sewer connections.

No.	Subcounty	Selected Areas	Proposed Scope
1.	Dagoretti	Gatina and Kawangware	-2 No. Ablution with water and sewer connection -Simplified sewers and waterlines to achieve 300 household connections
		Waithaka and Riruta	2 No. Ablution Block with water and sewer connection
2.	Embakasi	Kayole Soweto, Matopeni, Kamola, Vumilia, Karsan	-2 No. Ablution blocks and Simplified Sewers and waterlines to achieve 200 household connections
		Mukuru Kwa Njenga, Kwa Reuben, Kware,Lungalunga, Kisii Village,Hazina, Kayaba	-5 No Ablution Blocks, and waterlines and extension sewers -Pilot 10 No. Fresh-life toilets in Mukuru
3.	Kamukunji	Muthurwa/Gorofani/Bondeni/Majengo/Blue Estate	5 No. Ablution Blocks with water and sewer connection
4.	Kibra	Lindi/Sarang’ombe/	4 No. Ablution Block with water and sewer connection
5.	Makadara	Kiambiu	2 No. Ablution blocks, and waterlines and Simplified Sewers to achieve 200 household connections
6.	Mathare	Mathare 4A, Mathare, Mlango Kubwa	3 No. Ablution Blocks, waterlines and simplified sewers.
7.	3 No. Boreholes with elevated water tanks and water kiosks		

102 Quality and Approvals

The materials and workmanship shall be the best of their respective kinds and to the approval of the Project Manager. The words “to the approval of the Project Manager” shall be deemed to be included in the description of all items relating to design, construction, installation and materials and workmanship for the due execution of the Works.

The Contractor shall submit all data, details and samples as necessary and as reasonably requested by the Project Manager of all materials that the Contractor proposes to use in the Works. Method statements which adequately demonstrate the Contractor’s proposed method of working, methods of maintaining safety and compliance with the programme shall be submitted for the Project Manager’s approval prior to the commencement of work on any area of the Site.

Where the Contractor is responsible for the preparation of Construction Documents to describe the permanent works such Construction Documents shall be approved prior to the procurement of any materials or commencement of any work to which the documents relate.

No materials, Plant or equipment shall be procured for the Contract and no work, permanent or temporary, shall commence without first obtaining the Project Manager’s approval.

All materials, Plant and equipment supplied shall be designed for operation under the above described conditions.

103 Construction Documents

Drawings and Documents which are to be submitted by the Contractor to describe the Permanent Works shall become Construction Documents upon their approval.

All drawings, technical specifications, bill of quantities, schedules, cost estimates; programme and other information to be submitted by the contractor shall be in English and shall be submitted for approval in triplicate. Following approval, the contractor shall supply a further five copies to the Project Manager. Construction Documents shall not be departed from without the approval of the Project Manager.

All drawings and documents submitted by the Contractor shall have been checked, signed and be ready for issue and shall bear:

Title of the drawing or document;

- Scale;
- Date;
- Work item reference number complying with an approved numbering system;
- Name and references of the Contractor;
- Names of the employer and the Project Manager;
- Date of approval by the Contractor and the signature of the person responsible for approval.

Drawings and documents submitted for approval shall be delivered to the Project Manager’s office as designated by the Project Manager.

Unless otherwise specified the Contractor shall allow a minimum of 21 days, after the date of receipt by the Project Manager for approval of drawings and documents by the Project Manager.

104 Operation and Maintenance Manuals

The Contractor shall submit to the Project Manager for approval six copies of the Operation and Maintenance (O&M) Manuals as described in Clause 58 of the Contract Data.

The Contractor shall supply the final version of the O&M Manuals prior to the issue of the Taking-Over Certificate for either the whole of the Works or the respective Section or part of the Works. Each set shall be bound together in a stout plastic or other approved cover.

O&M Manuals shall be supplied written in English language, all parts and equipment listings shall be in English.

105 Level Datum

Before the commencement of constructional work the Contractor shall establish, in a position to the approval of the Project Manager, steel datum pegs which shall be securely concreted in. The level of these pegs shall be established and agreed with the Project Manager and all levels used in the construction of the Works shall be referred to these established datum points. The correctness of this datum shall be checked at regular intervals during the construction period as agreed with the Project Manager.

Where possible construction drawings and all levels used for construction shall be referred to the national height datum as defined by the Survey of Kenya. The Contractor shall be responsible for obtaining the location and values of the permanent bench marks. In cases where such bench marks do not exist, the site datum shall be agreed with the Project Manager.

106 Setting Out of the Works

The site layout drawings show indicative site layouts. Prior to commencing construction, the Project Manager will agree with the Contractor the basic information supplementary to that shown on the Drawings such as the position of manholes, chambers, centre-lines and base-lines sufficient for the Contractor to locate the Works.

The Contractor shall prepare detailed setting out drawings and data sheets as necessary and submit them to the Project Manager in triplicate for approval. Any modifications to the setting out drawings or data sheets required by the Project Manager shall be made by the Contractor and resubmitted for final approval. Should it be necessary during setting out or during construction for the approved setting out details to be amended, the Contractor shall amend the drawings or data sheets or make new ones for approval as required by the Project Manager.

For pipelines, the Contractor shall in the presence of the Project Manager set-out the pipeline alignments in accordance with the indicative alignments shown on the drawings taking into account physical features on the ground, any existing services, any requirements of relevant Authorities and any changes deemed necessary by the Project Manager, confirming the locations of all valves, air valves, washouts, hydrants and bends.

The Contractor shall prepare and submit to the Project Manager, at an approved scale, plans of the pipeline route and profiles of ground levels after any initial clearing of the wayleave or easement showing the proposed pipe invert levels and precise chainages for all valves and fittings for approval. Following approval the Contractor shall submit to the Project Manager two copies of the agreed alignment and profiles.

107 Boundaries of Works

The Employer shall provide the Site upon which the Permanent Works are to be constructed. Where a drain or pipeline is to be within an existing road or track reservation or is otherwise located in land designated Public Domain the Site width will be restricted to the limit of the public land. The existing boundary fences and walls shall not be disturbed without prior approval of the Project Manager and, unless road diversions and closure notices are approved and posted, carriageways shall be left available for the safe passage of traffic.

The Contractor shall not enter upon or occupy with men, tools, equipment or materials any land other than the site without the written consent of the owner of such land.

On occupation of the Site or other land the Contractor shall provide such fencing, as required.

108 Work through Private Land

In order that the necessary parts of the Site which are on private land may be obtained the Contractor shall supply the Project Manager with full information of his programme sufficiently in advance of the dates upon which the Contractor proposes to enter upon each areas of the Site. The Contractor shall where required, in consultation with the Project Manager, programme the Works to designate the areas of the Site to which the Contractor is to be given possession and the sequence of taking possession.

The Contractor shall obtain written approval before entering upon any private land or cutting through ditch, bank, hedge, wall, fence or any other form of boundary marking and he shall carry out all reasonable requirements as approved by the Project Manager in the matter of reinstatement.

109 Public Utility Mains and Services

Where the Contract indicates the positions of existing services or apparatus the positions shown are believed to be correct but no warranty is given as to the accuracy or completeness of the information.

It shall be the responsibility of the Contractor to obtain all information available from the Public Utility Authorities regarding the position of existing mains and services and he shall copy this information to the Project Manager as soon as he obtains it.

The Contractor shall carry out excavation works in a manner which safeguards any existing services, including hand excavation as necessary and shall be responsible for the cost of any repair work necessitated by damage caused by him to any main or service and for any costs arising from the disruption.

The Contractor shall obtain all information and assistance from the Public Utility Authorities for the locating of the mains and services and shall agree with the Project Manager any trial excavation which may be necessary to confirm or establish these locations.

The Contractor shall be responsible for locating all existing services, whether known to the Public Utility Authorities or not, and shall conduct his own survey as necessary to accurately locate all services. All efforts to identify these existing services shall be carried out in advance of conducting excavation for the permanent works.

Any temporary or permanent diversion of mains and services shall be agreed with the appropriate Authority.

110 Safeguards to Existing Pipes, Cables, Structures

It shall be the Contractor's responsibility to safeguard by means of temporary or permanent supports or otherwise all existing sewers, pipes, cables, structures or other things which would be liable to suffer damage if such precautionary measures were not taken.

Safeguards shall be to the approval of the Project Manager and of the undertaker or owner concerned.

111 Record Drawings

At all sites and any locations where the Contractor executes work under the Contract, including locations where the Contractor undertakes repair or rehabilitation work, the Contractor shall record the location and nature of all water supply and wastewater works including their ancillaries and any associated services.

Where instructed by the Project Manager for the purpose of producing Record Drawings, the Contractor shall undertake such surveys and investigations to determine the location of existing services. Such surveys and investigations shall be additional to those surveys and investigations undertaken by the Contractor for the purpose of determining the location of services prior to excavation.

The Contractor shall where necessary utilize appropriate equipment and where instructed by the Project Manager excavate trial pits to confirm the location and determine the size and nature of the buried services.

For sites where the Contractor undertakes permanent works Record Drawings shall be submitted to the Project Manager, for approval, in the form of As Built Drawings. In the case of repairs and rehabilitation the Record Drawings shall be submitted for approval within a period of 21 days following execution of the work.

Record Drawings shall be prepared to an approved format, and scale in line with the construction drawing.

112 Connections to Existing Pipes, Cables and Equipment

The Contractor shall be responsible for joining up and making connections between pipes and cables laid by him and existing pipes and cables. The Contractor shall submit to the Project Manager a drawing showing the details of the connection, and shall state the date on which the particular connection is required, and the work shall not proceed until the Project Manager's approval has been given.

The Contractor shall be responsible for ensuring the compatibility of new pipes and cables with existing pipework, cables, tubing and equipment.

113 Lighting, Watching and Traffic Control

Where necessary for safety of the public or where required by the Project Manager, the Works shall be properly fenced and signed. In addition, the Works shall be lighted from half an hour before sunset until half-an-hour after sunrise and at other times when visibility is poor. The position and number of the lamps shall be such that the extent and position of the Works are clearly defined. Each Site shall be provided with watchmen as required.

114 Contractor's Offices

The Contractor shall provide and maintain offices for the use of his representative and staff to which written instructions by the Project Manager can be delivered. Any instructions delivered to such offices shall be deemed to have been delivered to the Contractor.

Offices shall be located to give convenient access to the Works and shall be subject to the approval of the Project Manager. The Contractor shall be responsible for obtaining the land on which to establish any temporary site offices.

115 Project Manager's Office

The offices of the Project Manager shall comprise reception area, three (3) offices, a meeting room, kitchen and separate WC. They shall be served with electric lighting power, telephone line, potable water, networked broadband internet connection, heating and air conditioning. The broadband connection shall be networked throughout the office allow up to six computers to access the network. A wireless network is acceptable.

The Contractor shall make adequate provision for the drainage of rainwater, sink waste (grey water) and foul sewage. Fly screens shall be fitted on every opening window and steps shall be provided where the entrance is elevated above ground level. The Contractor shall arrange for the regular cleaning of the facilities and the removal of the solid waste. He shall maintain all equipment in working order throughout the duration of the contract and arrange for the supply of all consumables including mobile phone vouchers, stationery, etc.

Office 1 and 2 shall have a minimum covered floor area of 9 m² and office 3 shall have 25m² each and each shall contain the following:

Office 1	Office 2	Office 3
1 x double pedestal desk	1 x double pedestal desk	4 x double pedestal desks
1 x Executive Orthopedic chair	1 x Executive Orthopedic chair	8 x Orthopedic chairs
2 X Orthopedic Chairs	1 X Orthopedic Chairs	2 x 4 drawer lockable
1 x 4 drawer lockable filing cabinet	1 x 4 drawer lockable filing cabinet	2 x 5 tier shelving unit to
1 x 5 tier shelving unit to take A4	1 x 5 tier shelving unit to take A4 files	1 x plan table
1 x telephone unit	1 x telephone unit	2 x telephone units.

The meeting room shall have a minimum covered floor area of 20m² and shall contain the following:

1 x table (or tables of the same size) to accommodate 8 people's and 8 chairs
 1 x wall mounted pin board, 2m x 1m
 1 x wall mounted white melamine board, 2m x 1m 1 x AO size vertical plan chest
 1 x A3/A4 colour printer/photocopier/scanner/fax 1 x telephone unit

The kitchen shall be equipped with a sink, a 4 burner gas cooker, electric kettle and fridge together with appropriate work surfaces.

The separate WC shall be equipped with a low level WC suite with dual flush. Automatic air ventilation shall be provided where there is no opening window.

Other equipment to be supplied for the sole use of the Project Manager shall include:

Office paper punch	3 Nr
Whiteboard, 2.4m x 1.2m	1 Nr
Whiteboard, 1.2m x 1.2m	1 Nr
Office Tray (3 tier)	3 Nr

Office Stapling Machines	2 Nr
Steel File Cabinet with locks / 4 drawers ('Mecol' or equivalent approved)	3 Nr
'Casio' or similar small portable scientific electronic calculator	4 Nr
First Aid kit (for 10 persons) in Metal Box	2 Nr
Potable Fire Extinguisher (5 litres)	3 Nr
Small office scissors	3 Nr
Waste paper baskets	4 Nr
Electric kettle (capacity to make 12 cups of tea)	2 Nr
Coffee/Tea making facility including crockery for all supervisory staff 6 Nr. and 12 additional guests	1 Set
Pedestal electric fan, size 400mm	4 Nr
'LG' or equivalent approved Refrigerator (0.2 cu.m. capacity)	2 Nr
1TB External storage HDD	3Nr.
Desktop: HP Core i7 8700k - 16 GB - 1 TB HDD or similar approved complete with 24"	2Nr.
Laptop: <u>HP or similar approved</u> Windows 10 Pro 64Bit 10th Generation Intel® Core™ i7 processor 16 GB memory; 500 GB SSD	5 Nr.
Printers: HP OfficeJet 7510 Printer or similar approved	1No.
RICO DSm colour printer or similar approved	1No.
Petty Cash Box with security lock	1 Nr
Wall Clocks	3 Nr
Flashlights (battery powered)	1 Nr
Digital Camera (Sony DSC – W810 or similar approved)	2 Nr

The Contractor shall provide a Secretary who can speak English and is conversant in the use of above mentioned software for the duration of the Contract.

Stationery required per month as follows:

A4 Size Printing Papers	2 Reams
A3 Size Printing Papers	2 Ream
Biro pens blue/black/Red	12 No.
Box files	4 Nr
Spring Files	2 Nr
Document Wallets	3 Nr
Cellotape (medium)	1 Nr
Masking tape (medium)	1 Nr
Staples	2 Pac.
Paper clips (various sizes)	2 Pac.
CD-R (Pack of 12)	1 Pac.
USB 2.0/3.0 flash drives Minimum 16GB	4No.
Highlighters (set of all colours)	2 Sets
A6 hardcover notebooks	2 Nr
Soft Pencil Erasers (Staedtler or equivalent)	3 Nr
Envelopes (all sizes)	3 Doz.
Batteries for flashlights	1 Set
Colour and Black ink cartridges for the A3 printer	1 Set

Black ink cartridge/ toner for the A3 printer

3 Nr

Supply of clean towels every day, soap, lavatory paper, disinfectant and cleaning materials is to be provided and maintained throughout the Contract Period.

The cost of all the above services shall be included by the Contractor under item for maintenance and attendance for Resident Engineer's offices. Apart from the consumables, the rest of equipment will revert to the Employer at the end of the Contract.

The Contractor shall provide adequate space and facilities at a convenient location for meetings between the Project Manager and Contractor.

The Project Manager's office shall be in a well-lit, surfaced, fenced and secure compound with sufficient dedicated parking for 6 vehicles.

The compound shall be provided with 24-hour manned gate security to the approval of the Project Manager.

116 Vehicles for the Project Manager

The Contractor shall provide and maintain for the duration of the Contract vehicles for the use of the Project Manager. At the conclusion of the Contract the vehicles will be handed over to the Employer in a fully serviced and roadworthy condition, free from defects. Selection of vehicles shall be agreed with the Project Manager at the commencement of the contract and at minimum will be:

4WD, Twin Cab Pick-up, or approved equivalent, including road licenses, number plates, insurances, etc. The vehicle to revert to Employer after completion of Contract. Minimum specifications include but not limited to the following:

- Engine - 2.4 litres Turbo Diesel
- Rear Differential Gear Lock
- Braking System to include ABS (Anti-Lock Brake System)
- Gear Lock
- Power Steering with adjustable Steering Column
- Electronic Fuel Injection System.
- 5-6 Speed Manual Transmission
- Power Windows
- Immobiliser and Alarm System
- Fuel tank capacity minimum 80 litres
- Front Bull Bar

117 Contractor's Yards, Stores and Accommodation for Workmen

The Contractor shall be responsible for obtaining the land and for the provision of all temporary yards, stores, workshops, offices, mess rooms, shelters and for all services in connection therewith. The location of all such facilities shall be agreed beforehand with the Project Manager and shall be such as to avoid obstruction and nuisance to the public.

The Contractor shall construct secure storage compounds and storage building where he shall store at his own risk all equipment and Plant awaiting erection. The Contractor shall also provide secure covered storage for all samples submitted to the Project Manager for approval. Storage building shall be weatherproof and shall be of sufficient size to accommodate all items requiring covered storage.

The Contractor shall provide and maintain suitable and sufficient shelters and mess rooms for his workmen and supervisory staff as are customary and necessary. The Contractor shall provide

sufficient closets or latrines to the satisfaction of the relevant authority. They shall be properly screened and maintained in a clean and sanitary state at all times. The Contractor shall be responsible for making all arrangements for the proper disposal of waste.

118 Water and Electricity Supplies

The Contractor shall make all arrangements for and provide adequate supply of potable water to each site as necessary for the execution and testing of the Works and for use by his workmen.

The Contractor shall make arrangements for and provide any electricity supply required for the execution of the Works, including the Tests on Completion.

119 Contractor's Staff and Workmen

The Contractor shall agree to employ Kenyan workers to the maximum extent possible. The Contractor shall provide a competent Site Agent to the approval of the Project Manager to be in charge of the work who shall not be changed except with the consent of the Project Manager.

The Contractor agrees that his workmen and employees shall be considered for all purposes in his direct pay and employ and under his supervision and control. He shall be directly and personally responsible for discharging all obligations, financial or other, which may be or becoming owing to any such workman or employee or to his successors, assignees or personal representatives. There shall be no contractual or legal relations of any kind whatsoever between the Employer and any such workman, employee or any person employed in the performance of the Contractor's obligations under this Contract.

The Project Manager may request and the Contractor agrees to accept the request for the immediate removal from the site of any employee or worker of the Contractor adjudged by the Project Manager to be incompetent, disorderly, and unreliable or of bad character. Such employee shall not again be employed on the Works.

120 Training of Employers Workmen

The Contractor shall make provision for the on-site training of up to 3 of the Employer's staff.

121 Project Management

121.1 Project Control

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

- a) Planning and programme preparation particularly in relation to the requirements of the Employer and the public authorities, and the requirements to maintain water supply and waste water disposal services where careful detailed arrangements have to be made and adhered to.
- b) Planning the execution of the Works in a manner which minimizes disruption to the water supply system and will permit the efficient and effective commissioning of the water supply system and their respective components.
- c) Ensuring adequate potable water supplies and wastewater disposal services are maintained to

all consumers.

- d) Continuous surveillance of progress and anticipation of factors likely to affect the timely performance of the Contract.
- e) Making proposal for modification to forward planning and to the programme at an early stage in the light of factors resulting from (d) above.
- f) Continuous appraisal of the Contractor's methods and routines particularly as to their effect on the community and property.
- g) Forward planning for resource requirements taking due account of possible shortages and delays in the arrival on site of materials, equipment, plant and personnel and their mobilization for effective usage.
- h) Acquisition and process of up-to-date information for progress meetings with the Project Manager. The preparation of monthly progress reports including an update of the detailed programme and cash flow forecast which shall include progress photographs as directed by the Project Manager.

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

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

121.2 Monthly Statements and Certificates

Monthly statements and certificates shall be submitted in an approved manner and format. In addition to the statements submitted in hard copy the Contractor shall submit a computer copy using data base software as prescribed by the Project Manager. The statements and certificates shall detail the measured value of the work completed on each item of the Works in such detail that the

Project Manager can identify location and measurement of each item. A location shall constitute a single structure such as a reservoir, pump station or section of a pipeline or a component of a system such as a pipeline valve complex.

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

121.3 Progress Meetings

The Contractor shall provide a suitable venue, near the vicinity of the Site, and arrange progress review meetings to be chaired by the Project Manager at monthly intervals to coincide with submission of monthly progress submissions. The Contractor shall allow for attendance by the Project Manager and up to 4 representatives of the Project Manager's or Employer. The meetings shall be attended by the Contractor's senior representatives, Site Agent and other members of his senior staff as may be deemed necessary.

122 Equipment for the Employer

The Contractor shall hand over to the Employer on completion of the Works a complete set of tools and equipment together with spare parts and fittings to facilitate the maintenance and operation of the installed works.

123 Facilities for Survey and Inspection by the Project Manager

The Contractor shall make available technicians and such labour, materials and safety equipment as the Project Manager may require for inspections and survey work in connection with the Works. The Contractor shall provide all necessary tackle, test equipment, access, labour, staff and any other thing the Project Manager may reasonably require in order that he may safely, conveniently and quickly carry out such inspections as he deems necessary at any time during the execution of the Works and during the Defects Liability Period. The Project Manager, his representative and assistants, shall not inspect any area of the Works where they deem the safety provision to be inadequate and the Contractor shall undertake any work required by the Project Manager in order to make it safe.

The Contractor shall provide in accordance with the BoQ and the Specification the following instruments and equipment:-

- 1No. Geodetic GPS;
- 1 No. Total Station. Equipment complete with all accessories and software;
- 2 No. automatic level with tripod and accessories, with horizontal circle;
- 2 No. leveling staff, 4 meters long (with leveling bubble);
- 2 No. steel bands 30 meters long including staff level;
- No. steel tapes 3 meters long;
- 21 No. ranging rods;
- 1 No. spirit level 1 meter long;
- One steel straight edge 1 meter long, and all the poles, pegs, paint, templates, string lines and other requisites for setting out and measurement of the works;
- One tape repair kit;
- One 1 kg hammer;
- One 4 kg hammer.

124 Inspections by the Project Manager during Defects Liability Period

The Project Manager will give the Contractor due notice of his intention to carry out any inspections during the Defects Liability Period and the Contractor shall thereupon arrange for a responsible representative to be present at the times and dates named by the Project Manager. This representative shall render all necessary assistance and shall record all matters and things to which his attention is directed by the Project Manager.

125 Protective Clothing and Safety Equipment

The Contractor shall provide for the Project Manager, his Representative and assistants any additional protective clothing and safety equipment necessary for the proper discharge of their duties on the Site.

The Contractor shall provide any necessary protective clothing and safety equipment for the use of authorized visitors to the site including the Employer and his staff and representatives and those of any relevant authority who have reason to visit the Site.

126 Notice Boards

The Contractor shall provide and erect sign boards at the Sites where works are being executed, giving information to the public on the Project and the Employer and further details as will be

prescribed by the Employer. The location of the sign boards at the sites will be indicated by the Project Manager. The Contractor shall maintain, alter, move or adapt the sign boards from time to time as may be instructed by the Project Manager. The display of any named Sub-contractors or any other information associated with the Works shall be to the approval of the Project Manager.

127 Language of Correspondence and Records

All communications from the Contractor to the Project Manager shall be in the English language. All books, timesheets, records, notes, drawings, documents, specifications and manufacturers' literature shall be in the English language. If any of the aforementioned is in another language a certified translation in English shall be submitted to the Project Manager.

128 Standards and Regulations

Each and every part of the Works shall be designed, constructed, manufactured, tested and installed in accordance with an internationally recognized standard, Code of Practice, or Regulation applicable to that part of the Works.

Such standards and codes shall include:

- a) British Standard Specification last published.
- b) International Electromechanical Commission, where available (IEC).
- c) International Organization for Standardization (ISO).

The Contractor shall provide and keep permanently on site copies of such standards as may be directed by the Project Manager and shall make them available to the Project Manager as required.

129 Equivalency of Standards and Codes

Wherever reference is made in the Contract, including Specifications, Drawings and Bill of Quantities, to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified will be accepted subject to the Project Manager's prior review and written consent. In the event the Project Manager determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the Contract.

130 Quality Control

The Contractor shall be responsible for his own quality control and shall provide sufficient competent personnel for supervising the Works, taking and preparing samples and for carrying out all necessary tests.

131 Units

The International System of (metric) Units as set out in ASTM E380 shall be used throughout the Contract except where otherwise provided.

132 Inspection and Testing during Manufacture

The performance of each item of Plant or Pipe shall be tested in accordance with the Specification to the requirements of the Project Manager.

Test certificates in triplicate shall be submitted by the Contractor to the Project Manager within 2 weeks of the date of the tests. Type tests are not acceptable. Test certificates shall be supplied for tests carried out on the actual Plant being supplied.

Plant shall not be dispatched from the manufacturer's works until it has passed the specified tests and approval been given by the Project Manager.

The Project Manager shall at his discretion witness tests of individual items of Plant at the manufacturer's works. The Project Manager shall be given three weeks' notice in writing before such tests are to take place.

The acceptance by the Project Manager of any item of Plant or equipment after testing at the manufacturer's works shall in no way relieve the Contractor of his responsibility for the correct performance.

SECTION 2 EARTHWORKS, BACKFILLING AND RESTORATION

201 Conditions of Site

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

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

In the case of way leaves for pipelines the boundaries of the way leave will be defined by the Employer and the contractor shall where directed provide erect and maintain in position, from commencement to the final completion of the Works, in every section substantial timber stakes or similar approved markers not less than 1.5 m high indicating the position of the boundary at 100m or other such intervals as the Project Manager may direct. In the event of any boundary or survey mark established for the purpose of land title being disturbed or displaced the Contractor shall forthwith replace the beacon. Where necessary the Contractor shall employ the services of an approved licensed surveyor for the purpose of setting out boundaries.

202 Site Clearance and Topsoil Removal

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

Before beginning clearance in any area the Contractor shall give seven days written notice of his intention to the Project Manager who will determine the extent and limits of such clearance.

Topsoil shall mean the surface layer of soil which by its humus content supports vegetation and is unsuitable, as a formation to roads and concrete structures or as a backfill or bedding material. The extent and depth of topsoil that needs removal shall be agreed with the Project Manager. Topsoil shall be set aside for re-use or disposal as directed by the Project Manager.

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

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

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

203 Erosion

The Contractor shall take care at all times to prevent erosion on every site and elsewhere on land which may be affected by his operations and the Project Manager may impose

such reasonable limitations and restrictions upon the method of clearance and upon the timing and season of the year when clearance is carried out as the circumstances warrant.

204 Ground Levels

Before commencement of any earthworks or demolition the sites shall be surveyed, as necessary, in conjunction with the Project Manager to establish existing ground levels. These agreed ground levels shall form the basis for the calculation of any subsequent excavation and filling.

205 Trial Holes

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

206 Excavation Generally

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

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

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

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

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

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

207 Excavation in Excess

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

In pipe trenches where the pipe is not bedded on or surrounded with concrete, excess excavation shall be filled with compacted granular material. Excess excavation in rock

trenches shall be filled with concrete (15N/mm² compressive strength) up to 150mm below the pipe invert.

208 Mechanical Excavation

Mechanical excavation shall be employed only if the subsoil is suitable and only in such manner which will allow adequate support of the excavations. The Contractor shall ensure that there are no pipes, cables, mains or other services or property which may be disturbed or damaged by its use.

209 Excavation for Pipelaying

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

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

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

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

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

210 Headings

Excavation for pipes in heading shall be carried out to the approval of the Project Manager and to dimensions which will permit a proper inspection to be made. The heading shall be properly and securely timbered. The pipe shall be laid on a minimum thickness of 150mm of concrete. After the pipe has been laid, jointed and tested the heading shall be filled in short lengths not exceeding 1 metre with Grade C15P concrete or as directed. The heading shall be completely filled with concrete and hard filling shall then be rammed into the concrete at the crown of the heading.

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

211 Excavation for Foundations of Structures

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

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

Formations which are to receive concrete blinding or a drainage layer shall be covered with such blinding or layer immediately the excavation has been completed, inspected and approved by the Project Manager.

Surfaces against which permanent works are to be placed shall be kept free of oil, water, mud or any material.

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

212 Rock Surfaces under Concrete Structures

212.1 Concrete Placed Directly on Rock

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

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

212.2 Concrete Placed on Capping Layer

Where instructed the rock excavation shall be taken down to a depth of 1.0m below the underside of the structure and the excavation backfilled with capping materials to the required formation level. Capping material shall be granular material. The material shall be compacted in 150mm layers to achieve a density of not less than 95% maximum dry density at optimum moisture content + 5% to 2% as determined by the BS heavy compaction tests to BS 1377.

213 Explosives

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

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

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

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

Blasting shall be carried out so as not to weaken existing structures or the foundations or ground adjacent to the existing and proposed works. The Contractor shall take all necessary

precautions to prevent loss, injury or accident to persons or property and shall be entirely liable for any accident or damage that may result from the use of explosives.

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

214 Excavated Materials Suitable for Re-use

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

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

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

During excavation of pipe trenches the Contractor shall ensure that all granular or other approved material suitable for filling around and over pipes shall be kept separate and re-used for this purpose.

Paving slabs, bricks and similar surfaces shall be carefully removed and stacked. Prior to the commencement of excavation the number of badly broken and unsuitable paving slabs, bricks etc. on the line of the excavations shall be agreed with the Project Manager.

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

215 Backfilling of Excavations

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

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

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

216 Pipe Beddings

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

Pipe Nominal Diameter (mm)	Max Size (mm)	Grading (mm)
<50	sand	N/A
50	10	10 single-size
80	10	10 single-size
100	10	10 single-size

150	15	10 or 14 single-size or 14 to 5 graded
200 to 500	20	10, 14 or 20 single-sized or 14 to 5 graded or 20 to 5 graded
>500	40	10,14 20 or single-size crushed rock or 14 to 5 graded or 20 to 5 graded or 40 to 5 graded

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

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

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

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

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

Class S bedding shall comprise a complete surround of granular material in accordance with the above table to a depth of 150mm above the crown of the pipe.

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

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

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

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

217 Compaction Fraction Test

217.1 Apparatus required:

- 1) Open-ended cylinder 250 mm long and 150mm \pm 5mm internal diameter (150mm diameter pipe is suitable);
- 2) Metal hammer with striking face 38 mm diameter and weighing 1 kg.
- 3) Rule.

(iii) 217.2 Method

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

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

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

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

218 Selected Backfill Material

Backfill in contact with the pipes shall be selected material and shall not contain large stones, rocks, tree roots or similar objects which through impact or by concentrating imposed loads might damage the pipes. The material shall be capable of being compacted without the use of heavy rammers and should be free of clay lumps or other material larger than 75mm or stones larger than the maximum particle size specified for pipe bedding.

219 Backfilling of Pipe Trenches

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

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

The material shall be placed in layers not exceeding 150mm thickness and compacted by the use of rammers to achieve a density of not less than 95% maximum density at optimum moisture content $\pm 5\%$ to -2% as determined by the BS Heavy Compaction Test to BS 1377.

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

The density of the compacted fill shall be determined by the Contractor using the “sand replacement” method as directed by the Project Manager.

Before backfilling trenches the Contractor shall obtain approval from the Project Manager of the methods he proposes to use and shall demonstrate by means of tests that the specified compaction can be achieved. The method of compaction shall at all times be to the approval of the Project Manager.

Where ground water conditions are such that the bedding material would be likely to act as a carrier for ground water from higher or lower ground, the Project Manager may instruct flow barriers of suitable selected earth or concrete to be inserted in lieu of bedding material. Such barriers to be erected at reasonable intervals close to flexible joints in the pipe.

220 Making Good Subsidence after Backfilling

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

Should subsidence occur after any surface reinstatement has been completed the surface reinstatement shall first be removed, the hollows made up, and then the surface reinstatement re-laid.

Any subsidence that occurs adjacent to the Site of the Works which is attributable to the Contractor's activities shall be reinstated to the full satisfaction of the Project Manager.

221 Removal of Timbering from Excavations

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

222 Reinstatement of Surfaces

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

Temporary reinstatement and permanent reinstatement of all surfaces, affected by the operations of the Contractor shall be carried out and maintained to the satisfaction of the Project Manager and the responsible authority or owner.

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

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

Reinstatement of surfaced roads shall be carried out to the approval of the relevant authority. The responsible authority shall have the right to carry out permanent reinstatement at the Contractor's expense.

Trenches in open ground shall be reinstated to the condition in which the ground was before excavation was commenced. The final surface of the trench shall be flush with the surrounding ground.

In verges and other grass surfaces and after the backfilling had been thoroughly consolidated the topsoil shall be re-laid rolled and planted with grass or other vegetation as directed by the Project Manager as may be necessary and watered until the grass has become well established. Should the planting fail it shall be replanted as required until satisfactory growth is obtained. If at any time any reinstatement deteriorates the Contractor shall restore it to a proper condition immediately.

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

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

The trenches shall be refilled and rammed solid as specified in the Contract and shall not be topped up above the original surface level to allow settlement.

If any trench becomes dangerous the Project Manager may call upon the Contractor for its reinstatement at three hours' notice and failing this to have the work done by others at the Contractor's expense.

In the case of footpaths the trench shall be refilled and rammed as specified to within 125mm of the surface. A foundation layer of 100mm compacted thickness of approved crushed limestone shall then be laid and compacted. The surface shall be cleaned and primed and the footpath surfacing shall be temporarily reinstated with 25mm compacted thickness of 14 mm nominal size dense wearing course macadam laid and compacted so as to achieve a dense, smooth and even course surface using a roller of 750 to 3000kg mass. Any kerbs shall be reinstated to their original condition.

The trench surface shall be thus maintained until the end of the Period of Maintenance or permanent reinstatement is ordered by the Project Manager. Where permanent reinstatement is ordered by the Project Manager the temporary surface and part of the foundation shall be removed to 50mm depth to permit the construction of a tiled or paved surface to match the original surface. An approved tiled or paved surface shall then be laid and bedded on sand or mortar to an even finish.

223 Safety of Excavations in Roads

Where the surface of the road (other than that which lies immediately above the trench) is damaged either by the concentration of traffic caused by an open trench, by subsidence or other causes arising from the operations of the Contractor, he shall permanently reinstate the whole of the surface so damaged to its original condition.

The Contractor shall ensure that trenches and reinstatement are maintained in a safe condition and shall take immediate action to remedy any deterioration which renders the works unsafe. If in the opinion of the Project Manager any excavation or reinstatement is in a dangerous condition the Contractor shall immediately remedy the defect. Should the Contractor fail to carry out the reinstatement promptly the work may be carried out by others at the Contractor's expense.

224 Temporary Reinstatement of Asphalted Roads

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

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

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

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

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

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

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

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

225 Temporary Reinstatement of Unmade Roads

In all unmade roads the trenches shall be refilled and compacted as specified in the Contract to within 150mm of the surface.

The trench shall be surfaced with 150mm compacted thickness of base layer material as specified above.

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

226 Permanent Reinstatement of Asphaltic Roads

Where instructions are given that permanent reinstatement is to be carried out then the temporary asphaltic concrete surface and part of the foundation layer shall be removed to a minimum depth of 200mm and the surface of the foundation shall be rolled, all dust and debris removed, joints cut straight and vertical.

The permanent reinstatement shall comprise crushed limestone material to a total compacted thickness of 150mm and the wearing course 50mm compacted thickness of 14 mm nominal size dense wearing course asphaltic concrete. The laying and finishing of the coated macadam shall be carried out so as to achieve a dense, smooth and even surface using a roller of not less than 12 tonnes mass.

227 Forming Banks and Filled Areas

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

228 Restoration of Borrow Areas, Spoil Tips and Quarries

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

229 Top soiling and Grassing

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

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

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

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

230 Free Draining Fill

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

231 Hardcore

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

SECTION 3. CONCRETE WORKS – GENERAL

301. Scope

The standard of materials and of workmanship shall not be inferior to the recommendations of the current:

- a) BS EN – 1992 – Structural Use of Concrete

The requirements outlined in the above documents must be read with those of this Section of the Specification and where any conflict exists between the recommendations of the above and of this Specification, the requirements of the Specification shall prevail. As and when required by the Project Manager the Contractor shall prepare and submit, before commencing the work, a time chart (additional to the general programme) detailing the various operations for concrete work.

No material shall be used in the Works until prior approval for its use has been given by the Project Manager; neither shall any change in the nature, quality, kind, type, source of supply or manufacture be made without the Project Manager's permission.

Names of manufacturers and test certificates for materials not supplied by the Employer shall be supplied as soon as possible to the Project Manager.

The cost of providing samples and the cost of carrying out tests required by Clause 306 (except as otherwise provided in the Conditions of Contract) together with the cost of supplying equipment for sampling and site testing indicated in columns 3 and 4 of Table 3.8 of this Section of the Specification shall be borne by the Contractor.

During the progress of the Works, consignment notes for materials not supplied by the Employer shall be supplied to the Project Manager giving details of each consignment.

The Contractor shall provide all samples required by the Project Manager as soon as possible after contract award. No deliveries in bulk shall be made until the samples are approved by the Project Manager. All condemned material shall be removed from the site within 24 hours.

A competent person approved by the Project Manager shall be employed by the Contractor whose duty will be to supervise all stages in the preparation and placing of the concrete. All cubes shall be made and site tests carried out under his direct supervision, in consultation with the Project Manager.

All materials which have been damaged, contaminated or have deteriorated or do not comply in any way with the requirements of these Preambles shall be rejected and shall be removed immediately from the site at the Contractor's expense. No materials shall be stored or stacked on suspended floors without the Project Manager's prior approval.

The use of the word "approved" in this Specification refers to the approval of the Project Manager or his delegates.

Cross-references between certain clauses of this Specification have been shown in brackets following the particular item.

302 Concrete

(iv) 302.1 Requirements

The mix proportions shall be selected to ensure that the workability of the fresh concrete is suitable for the conditions of handling and placing, having regard to the structural element being constructed, the disposition of reinforcement, and taking full account of the environment to which it will be subjected.

The minimum cement contents and maximum water/cement ratios of designed mixes shall be as given in Table 3.1.

The maximum cement content in any mix shall not exceed 425 kg/m³ for normal structures and 500 kg/m³ for liquid retaining structures.

In all cases of mix proportioning, the added water shall be included with due allowance for the moisture contained in the aggregates and shall be the minimum consistent with the workability requirements.

Table 3.1 Minimum Cement Contents

Normal Conditions

Type of Structural Element	Exposure Conditions (BS 8110)	Minimum Cement Content (kg/m ³)	Maximum Aggregate Size	Maximum Water/Cement Ratio

Additional Requirements when Exposed to Sulphate Conditions (All Structural Concrete)

Concentration of Sulphates (expressed as % of SO ₃)		Minimum Cement Content (kg/m ³) Maximum Aggregate Size				Maximum Water/ Cement Ratio
In soil (Total SO ₃)	In ground water	Type of Cement	40 mm	20 mm	10 mm	
≤ 0.2	≤ 30	No Special Precautions				-
0.2 - 0.5	30 - 120	OPC or CEM I, II or IV	300	330	370	0.50
		SRPC	250	280	320	0.55
0.5 - 1.0	120 - 250	OPC or CEM I, II or IV	Not permitted			-
		SRPC	300	330	370	0.50
1.0 - 2.0	250 - 500	OPC or CEM I, II or IV	Not permitted			-
		SRPC	340	370	410	0.45
≥ 2.0	≥ 500	SRPC	Ditto but with protective coating			0.45

OPC - Ordinary Portland Cement
 SRPC - Sulphate Resisting Portland Cement

302.2 Strength

The characteristic strength of concrete means that value of the 28-day cube strength below which 5% of all possible test results would be expected to fall.

The relationship between grade of the concrete and its characteristic strength shall be as given in BS 5328. The grade of concrete to be used in particular locations shall be as given in Table 3.2 unless noted otherwise on the drawings.

(v) Table 3.2 Concrete Strength Requirements

Location	Maximum Coarse Aggregate Size (mm)	Grade of Concrete (BS 5328)
Blinking Concrete - General Structures	20 or 40	C15P
Blinking Concrete - Liquid Retaining Structures	20	
Blinking Concrete - Sulphate Condition	20	C20P
Substructure thickness less than 400 mm	20	C25D
Substructures, walls and slabs more than 400 mm	20 or 40	C25D
Superstructures, Normal Concrete	20	C25D
Liquid Retaining Structures	20	C30D
Fine Concrete	10	C25D
Precast Concrete	10 or 20	C30D

In the above table suffix P means a prescribed mix, D means a designed mix and A means a design mix complying with the requirements of BS 8007.

302.3 Mixes

(a) Designed Mixes

Proportions shall be determined in accordance with the "Design of Normal Concrete Mixes" published by the United Kingdom Department of The Environment and obtainable from:-

Building Research Establishment and Bookshop
 Garston
 Watford
 WD2 7JR
 ENGLAND

Tel: +44 1923 894040
 Fax: +44 1923 664010

Or other approved methods, for the requirements set out in this Specification.

For the purpose of determining the design mean strength of the concrete a margin shall be added to the characteristic strength for the particular grade of concrete. This design margin shall be assessed on the degree of control reasonably to be expected in the manufacture of the

concrete and shall neither be less than 5.0 N/mm² nor less than 1.64 times the standard deviation. Until such time as the standard deviation has been assessed the margin shall be not less than 7.5 N/mm².

Details of the designed mixes shall be forwarded immediately to the Project Manager for his approval.

(b) Prescribed Mixes

Proportions for the several grades of concrete shall conform to the requirements of Tables 3.3 and 3.4.

(d) Chloride Content

The total chloride content of the concrete mix shall comply with the requirements of BS 8500: Part 2: Section 5

302.4 Quality Control

The principal basis of control shall be by comparison of the results of the compression cube tests at 28 days, except for small quantities of concrete whose strength can be otherwise derived and which is permitted for use by the Project Manager. 40 sample cubes shall be made initially in eight samples each day for five days of concreting and thereafter one sample per 25 m³ of concrete but not less than one sample for each day's concreting.

Where materials are of an unfamiliar grading or type, compression cube tests shall be carried out at 7 days and adjustments made in advance of the main control methods outlined above.

Cube test results will be examined individually in 10 consecutive sets of four and the standard deviation and mean strength of each set calculated. The concrete mix proportions will only be acceptable if all of the following requirements are complied with: -

- (i) Not more than two results in 40 are less than the characteristic crushing strength.
- (ii) No value of the average for any set of four results is less than the characteristic strength plus one-half of the design margin (Clause 302).
- (iii) When 40 results have been obtained and the mean strength and standard deviation are calculated, the mean strength minus 1.64 times the standard deviation shall be greater than the characteristic strength.

Where the results do not conform to the above requirements the following action shall be taken:-

- Adjustments to the mix shall be made to obtain the strength required.
- In the case where any result is less than 80% of the characteristic strength the structural implications shall be considered and action taken as ordered by the Project Manager (as provided for in Clause 305).

For those Prescribed Mixes required to be tested, requirements (i) and (ii) only will be applicable.

302.5 Production

Aggregates and cement shall be proportioned by weigh-batching, and water shall be proportioned by volume. Subject to the prior approval of the Project Manager volume-batching of aggregates may be used for small sections of works, but volume batching of cement will in no case be accepted. The Contractor may, however, so proportion the mix that each batch shall use a whole bag or bags of cement, the weight of which is known precisely. Where permission has been given for volume batching of aggregates, all gauge boxes shall be accurate and due allowance shall be made for the bulking of the aggregates in assessing the correct volume to be used.

The aggregates and the cement shall be thoroughly mixed in a clean mechanical mixer for a period of time agreed with the Project Manager and the water added on the basis of the approved design.

The amount of water added shall conform to the requirements of Clause 302.

Batching mixing machines shall comply with the requirements of BS 1305. They shall be provided in such numbers and of such capacity as to ensure a continuous supply of freshly mixed concrete at all times during construction.

Target strength for trial mix = 1.3 x Characteristic Strength

Target strength for works = 1.2 x Characteristic Strength

Continuous mixing machines shall be used only with the written permission of the Project Manager.

Not less than 30 days prior to the installation of the Contractor's plant and equipment for processing, handling, transportation, storing and proportioning ingredients, and for mixing, transporting and placing concrete, the Contractor shall submit drawings for approval by the Project Manager, showing proposed general plant arrangements, together with a general description of the equipment proposed for use.

After completion of installation, the operation of the plant and equipment shall be subject to the approval of the Project Manager.

Where these Preambles, the Bills of Quantities or the Drawings require specific procedures to be followed, such requirements are not to be construed as prohibiting use by the Contractor of alternative procedures if it is approved by the Project Manager, prior to use of such alternatives.

Approval of plant and equipment or their operation, or of any construction procedure, shall not operate to waive or modify any provision or requirements contained in the Preambles governing the quality of the materials of the finished work.

(vi) Table 3.3 Prescribed Mixes - Mass of Dry Aggregate to be Used With 100 kg of Cement

Grade o	Nominal maximum size of aggregate (mm)	40		20		14		10	
	Workability	Medium	High	Medium	High	Medium	High	Medium	High
	Range for standard sample (mm)	50-100	80-170	25-75	65-135	5-55	50-100	0-45	15-65
C7.5P C10P C15P C20P C25P	Total aggregate	kg	kg	kg	kg	kg	kg	kg	kg
		1080	920	900	780	N/	N/	N/	N/
		900	800	770	690	A	A	A	A
		790	690	680	580	N/	N/	N/	N/
		660	600	600	530	A	A	A	A
		560	510	510	460	N/	N/	N/	N/

N/A not applicable

(vii) Table 3.4 Prescribed Mixes - Percentage by Mass of Fine Aggregate to Total Aggregate

Grade of concrete	Nominal maximum size of aggregate (mm)	40		20		14		10	
	Workability	Medium	High	Medium	High	Medium	High	Medium	High
C7.5P } C10P } C15P		30-45		35-50		N/A		N/A	
C20P } } C25P } C30P	Grading Zone 1								
	2	35	40	40	45	45	50	50	55
	3	30	35	35	40	40	45	45	50
	4	30	30	30	35	35	40	40	45

N/A implies 'Not Applicable'

Notes on the use of Tables 3.3 and 3.4

NOTE 1. The proportions given in the tables will normally provide concrete of the strength in N/mm² indicated by the grade except where poor control is allied with the use of poor materials.

NOTE 2. For grades C7.5P, C10P and C15P a range of fine-aggregate percentages is given; the lower percentage is applicable to finer materials such as zone 4 sand and the higher percentage to coarser materials such as zone 1 sand.

NOTE 3. For all grades, small adjustments in the percentage of fine aggregate may be required depending on the properties of the particular aggregates being used.

NOTE 4. For grades C20P, C25P and C30P, and where high workability is required, it is advisable to check that the percentage of fine aggregate stated will produce satisfactory concrete if the grading of the fine aggregate approaches the coarser limits of zone 1 or the finer limits of zone 4.

302.6 Cement

Cement shall, as a minimum, meet the requirements of CEMI-32.5, CEMII-32.5 or CEMIV-32.5 in accordance with Kenya Standard KS 1725 Part 1 (Composition, Specifications and conformity criteria for common cements) and Part 2 (conformity Evaluation). Concrete for power floated floors shall as a minimum meet the requirements of CEMI-42.5, CEMII-42.5 or CEMIV-42.5.

Approval to the use of cement manufactured to the above standards or any other approved standards shall be subject to the Contractor demonstrating that the resulting concrete shall meet the strength requirements as given in the drawings and the relevant sections of the Concrete Specifications.

Pulverised-fuel ash shall have a maximum colour index of 6 (Colour comparator disc reference No. 296570) when measured using the Lovibond Colour Comparator system as recommended in BS 3892: Part 1 Appendix H, Clause H8.

Cement shall be fresh when delivered to Site and the consignments shall be used in the order of their delivery. The Contractor shall mark the date of delivery on each consignment and each consignment shall be stored separately and in such manner as to be easily accessible and identifiable.

No cement in bags or other containers shall be used unless these and the manufacturer's seals are intact at the time of mixing.

If the cement is delivered in bags it shall be stored in a waterproof shed or building at a temperature of not less than 8°C and the bags shall be placed on dry boards above the floor to prevent deterioration or contamination from any cause.

Bulk cement may be used provided it is stored in an approved container.

The Contractor shall not use cement which has hardened into lumps, but subject to removal of the lumps by screening, the Project Manager may allow such cement to be used in non-structural concrete mixes.

Cement of different types shall be kept separate in storage and shall not be mixed together in the production of concrete.

302.7 Aggregates

The Contractor shall investigate the proposed aggregate sources in detail and shall submit a comprehensive report with technical information and data which shall include the following:

- (a) Location. Only Sources equipped with facilities adequate for the production of the materials as specified and in such quantities as shall be required for the prompt execution of the Contract shall be approved.
- (b) Petrology of sources and possible or likely variability during the Contract period.
- (c) Method of production
- (d) Schedule of available and proposed processed aggregates by size, including details of actual screen sizes to produce each aggregate.
- (e) Test data as applicable for each aggregate type and size based upon representative samples and tested in accordance with the appropriate British Standards.
- (f) A detailed statement of the aggregate proposed for use in each grade of concrete.

Samples of all aggregate, including fine aggregates and sand shall be submitted to the Project Manager for his approval. All samples shall be taken in accordance with BS 812 and shall weigh not less than the minimum weight indicated on Table 1 of that Standard.

The Contractor shall produce with each consignment or at intervals directed by the Project Manager a certificate signed by the Supplier, or other approved analyst, giving fully detailed chemical and physical properties of all aggregates together with a sieve analysis carried out in accordance with the appropriate British Standard.

Any changes in the particulars of the aggregates which occur during the course of the Contract must be notified to the Project Manager without delay.

The aggregates shall be stored on Site in separate stockpiles so arranged as to prevent the intermingling of the various aggregate sizes. The stockpiles shall be suitably protected to prevent contamination of the aggregates from the ground, rubbish or by leaves, dust or other windblown materials.

Aggregates shall conform to the requirements of "Acceptable Standards" of Table 3.8.

Building sand for mortar and similar uses and aggregates for concrete shall comply to BS 882 and shall be perfectly clean and free from all foreign matter and shall not consist of, nor contain argillaceous limestone or shells.

Where the nominal size specified exceeds 37.5 mm the grading shall be subject to the Project Manager's approval or in accordance with his directions.

Unless otherwise agreed with the Project Manager, single-sized aggregates shall be used in batching and mixing concrete.

The following impurities in both fine and coarse aggregates shall not exceed the limits stated in the following clauses.

The total chloride content of the concrete mix arising from the aggregate together with that from any admixtures and any other source, expressed as a percentage of chloride ion shall not in any circumstances exceed 0.1%.

Note: Marine aggregates and some inland aggregates contain chlorides. Both should be selected carefully and marine aggregates necessitate efficient washing to achieve the 0.1% chloride ion limit. Wherever possible, the total chloride content should be calculated from the mix proportions and the measured chloride content of each of the constituents.

Concrete made with some aggregates exhibit Alkali-Silica Reaction (ASR). This phenomenon is particularly detrimental in structures subject to wetting and their use will not be allowed in such structures.

Prior to acceptance of an aggregate as inert to alkali reaction the report of a qualified geologist, appointed by the Project Manager on the suitability or otherwise of materials shall be obtained following examination of all types of material that the proposed sources will yield during the course of the contract. The Project Manager may require that samples be taken from boreholes and if the contract extends over a long period then more than one report shall be obtained.

The Project Manager may order further tests to be carried out on the aggregates proposed by the Contractor for the structures in connection with this Contract before permission is given to use the aggregates proposed by the Contractor.

Where allowed by the Project Manager to use reactive or potentially reactive aggregates in certain structures the Contractor shall take all suitable measures to prevent deterioration of concrete due to alkali-silica reaction. Such measures shall include the use of cement with an acid soluble equivalent of sodium

oxide content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of less than 0.6%. The reactive alkali content of the concrete mix shall in no circumstances exceed 3 kg/m^3 .

The Alkali-Silica Reaction (ASR) in hardened concrete is also affected by the water-cement ratio. Therefore, where ASR aggregates are used, with the permission of the Project Manager, the water-cement ratio shall be kept to a minimum (in the region of 0.4).

Aggregates required for use in the construction of concrete water retaining, water excluding and other similar structures shall have a low drying shrinkage and the water absorption shall not exceed 3%.

The absorption of the aggregates shall be measured in accordance with BS 812, Part 2.

Aggregates of rounded shape or otherwise capable of producing a concrete of good workability with the minimum addition of water shall be preferred.

Dust or flour resulting from crushing the aggregate shall not be allowed to contaminate the stockpiles. When, in the opinion of the Project Manager such contamination has taken place it shall be removed by an approved means or otherwise the aggregate shall be rejected.

For mass concrete, in order to improve the consistency of the mix, dust or flour resulting from crushing the aggregate, which may be subjected to test, be included in controlled quantities to supplement the fine aggregate.

Except where aggregates have been otherwise specified on the Drawings the grading of aggregates shall be as follows:

- (i) Coarse Aggregate:
 - (a) 10 mm max. size, graded, for all "fine" concrete.
 - (b) 20 mm max. size, graded, for all reinforced concrete in beams and for walls and slabs not greater than 400 mm thick.
 - (c) 40 mm max. size, graded, for all reinforced concrete walls and slabs in excess of 400 mm thick.
- (ii) Fine Aggregate:
 - (a) Where aggregates conforming to Zones 2 or 3 of BS 882 are available they shall be used.
 - (b) For Prescribed Mixes, Zones 1, 2, or 3 aggregates only shall be used.

Fine and coarse aggregates shall be as defined by and be of the quality and nature required by BS 882. In addition they shall be chemically inert to alkali reaction.

302.8 Water

The Contractor shall supply all water, make all arrangements and pay all charges in respect of such supply. Where water can be obtained from a public water supply it shall be used.

Where water cannot be obtained from a public supply it shall be tested in accordance with BS 3148 and if necessary shall be treated to assure compliance therewith.

Water for washing and curing shall be such that it will impair neither the strength of the finished concrete nor its appearance.

302.9 Admixtures

- (i) General : The quantity and method of using admixture's shall be in accordance with the manufacturer's recommendations and in all cases shall be subject to the approval of the Project Manager. Unless otherwise specified or approved by the Project Manager, an admixture shall comply with one of the following :-

BS 1014 (Pigments for Portland cement and Portland cement products). BS

5075 (Concrete admixtures except chloride based admixtures).

In all cases the Contractor shall provide the following information for the Project Manager's approval :-

- (a) the quantity to be used, in kilograms per kilogram of cement and in kilograms per cubic metre of concrete;
 - (b) the detrimental effects caused by adding a greater or lesser quantity in kilograms per cubic metre of concrete;
 - (c) the chemical name (s) of the main active ingredients;
 - (d) whether by the Project Manager, the Contractor shall demonstrate the action of an admixture by means of trial mixes.
- (ii) Calcium chloride. The use of calcium chloride in any form is prohibited.

302.10 Control of Alkali-Silica Reaction

The risk of cracking and expansion due to alkali-silica reaction shall be minimised by compliance with the specification and guidance notes set out in Technical Report No. 30 of the Concrete Society, Riverside House, 4 Meadows Business Park Station Approach, Blackwater, Camberley, Surrey, GU17 9AB Fax: +44 (0) 1276 607141, Website: www.concrete.org.uk.

303 Reinforcement

303.1 Steel

Reinforcement shall be:

- (a) Plain round mild steel or High Yield steel bars conforming to BS 4449.
- (b) Cold worked steel bars conforming to BS 4449: 1988.
- (c) Fabric reinforcement made of cold drawn high tensile bars conforming to BS 4483.

The Contractor shall obtain from his suppliers certificates of the mechanical and physical properties of the reinforcement and shall submit them to the Project Manager for approval, except where

reinforcement has been supplied by the Employer. The frequency of sampling and the method of quality control shall be in accordance with Table 4 and Clause 20 respectively of these British Standards. All high yield and cold worked bars (except in welded fabric reinforcement) shall be deformed bars complying with Classification Type T2 for bond strength in accordance with BS 4449. Where galvanised reinforcement is specified, galvanising shall comply with the requirements of BS 729, Part 1.

303.2 Storage

Reinforcement shall be stored on Site under cover and supported clear of the ground and in such manner as to make identification easy. Supports shall be such that distortion of the steel is avoided and contamination and corrosion prevented.

303.3 Bending and Fixing

The Contractor shall provide on Site facilities for cutting and bending reinforcement whether he is ordering his reinforcement bent or not and shall ensure that a token amount of straight bar is available on Site for bending as and when directed by the Project Manager.

Reinforcement shall be wire brushed and cleaned at the Contractor's expense, before and/or after it is placed in position, if required by the Project Manager.

The bars shall be cold bent in strict accordance with the drawings and the Contractor shall be responsible for the accuracy of the bending. Bending dimensions shall be worked to the tolerances indicated in BS 4466 and BS 8110 table 3.28. Bars in which any errors in bending are beyond the limits of the foregoing tolerances shall be replaced at the Contractor's cost by correctly bent new bars, or, may be straightened and rebent cold subject to the Project Manager's prior approval. Any discrepancy or inaccuracy found in the drawings shall be notified to the Project Manager immediately.

After bending, reinforcement shall be securely bundled and labelled with weather-proof tags or shall be marked with other approved signs by which it can readily be identified.

Before assembling or fixing the reinforcement the dimensions to which it has been bent shall be checked by the Contractor against the drawings.

The reinforcement shall be fixed in strict accordance with the drawings as regards cover, spacing and position, and suitable precautions shall be taken by the Contractor to prevent the displacement of reinforcement during the placing and compaction of concrete.

During concreting a competent steel fixer must be in attendance to adjust and correct the positions of any reinforcement which may be displaced. The vibrators are not to come into contact with the reinforcement.

Where required to support and retain the reinforcement in its correct position the Contractor shall provide templates, stools or other supports at his own cost. He shall allow for cutting to correct length all corner lacer bars included in the bar schedules as standard lengths.

Precast concrete support blocks for reinforcement shall be manufactured from Grade C30D "fine" concrete to ensure the correct cover thickness. They shall be well cured before use and

carefully stored on Site to avoid contamination. Plastic and metal supports, chairs, etc. may be used and shall be subject to the Project Manager's prior approval.

In the case of mild steel, a lap of not less than 40 diameters of the smaller bar shall be provided at the junction of two bars for which the lap is not specifically detailed on the Drawings and, in the case of High Yield steel, a lap of not less than 50 diameters.

All intersections of bars in walls and slabs and all connections between binders or links and main bars in columns or beams shall be tied with soft iron wire ties or with fixing clips which shall not be allowed to make contact with the formwork or to project materially into the specified cover.

Unless permitted by the Project Manager, welding of bar reinforcement at intersections or for the joining of bars is prohibited. Where permission is granted, welding shall be carried out in accordance with the recommendations of the Institute of Welding for the welding of reinforcing bars for reinforced concrete construction.

When fixed reinforcement is to be left exposed for more than eight weeks, it shall be thoroughly cleaned and painted with neat cement grout.

Where galvanised reinforcement is used any damage suffered by galvanising shall be made good by the application of an approved galvanising formulation, before concrete placing is commenced.

No concreting shall be commenced until the Project Manager has inspected the reinforcement in position and until his approval has been obtained and the Contractor shall give adequate notice of his intention to concrete.

303.4 Couplers

Couplers for reinforcement shall be either Standard Swaged Splices or Type II Alpha Couplers manufactured by CCL Systems, Unit 4, Park 2000 Millennium Way, Westland Road, Leeds, LS11 5AL, Telephone: +44 (0) 113270 1221, Fax: +44 (0) 113 277 8977, email: sales@cclstressing.com or similar approved. Where bars of different diameters are to be joined a CCL Reducer Sleeve or similar shall be used.

Couplers shall be suitable for the type and size of reinforcing bars and shall be capable of developing 115% of the characteristic strength of the smaller of the reinforcing bars being joined in both tension and compression. Couplers shall be installed in accordance with the manufacturer's recommendations. Square twisted reinforcing bars shall not be used with couplers.

304 Formwork

304.1 Requirements

The term "formwork" shall be taken to include centering, formwork, strutting, bracing and the like. When called upon to do so by the Project Manager the Contractor shall submit his formwork proposals for checking and approval by the Project Manager in advance of the concreting.

Formwork shall be of such accuracy, strength and rigidity as to carry the weight and pressure from the concrete to be placed on or against it, together with all constructional, wind or other loads likely to be imparted to it, without producing deformation of the finished concrete in excess of the tolerances outlined in Clause 304 and Table 3.5.

All formwork shall be sufficiently tight, without plugging, to prevent loss of grout during the vibration of the concrete. When required by the Project Manager, joints between formwork facing boards shall be sealed with foam rubber, sealing strips or other approved material. A foam rubber or polyurethane strip shall be provided around the tops of all walls and columns before affixing the forms for the next lift.

Faces of formwork shall be clean, free from projecting nails, adhering grout and other imperfections or defects which would prevent the specified surface finish from being attained. They shall be treated with approved mould oil before positioning. Great care shall be exercised to prevent reinforcement or steelwork from being contaminated by the oil during erection of the formwork.

Formwork, which as a result of prolonged use or general deterioration does not, in the opinion of the Project Manager, conform to the particular requirements set out in this clause, shall not be used.

Through-bolts or ties will not be permitted in liquid-retaining structures. The Contractor shall use only such bolts or ties as are capable of being removed in whole or in part so that no part remaining embedded in the concrete shall be nearer the surface of the concrete than the specified thickness of cover to the reinforcement.

Beam soffits shall be erected with an upward camber of 5 mm for each 3 metres of span. Top

formwork shall be counterweighted or otherwise anchored against flotation.

Boxes for forming holes shall be constructed so as to be easily removable without damaging the concrete during removal. They shall be properly vented to permit the escape of entrapped air, and shall be capable of being sealed, subsequently to prevent the loss of grout. The use of polystyrene blocks for the forming of holes, sinkings, etc. will not be allowed except by express permission of the Project Manager.

On all external edges risers of the concrete 20 mm chamfers shall be formed.

Openings for inspection of the inside of beam, wall, column and similar formwork and for cleaning-out purposes shall be formed so that they can conveniently be closed before the placing of concrete.

All props shall be supported on adequate sole plates and shall not bear directly on or against concrete. They shall be capable of being released gently and without shock from the supported formwork. No appliance for supporting the formwork shall be built into the permanent structure without the Project Manager's prior approval. Props for upper level support shall be placed directly over those at lower levels, and the lowermost props shall bear upon work sufficiently mature to carry the load.

Formwork shall be such as to allow for its removal without damaging the concrete, and in the case of suspended floors, for the removal of the beam sides and slab soffits without disturbing the beam-bottom boards and their props.

Before concreting, the areas which are intended to receive the concrete shall be cleaned by jetting with compressed air, and all water and extraneous material removed.

Where timber is used for formwork it shall be properly cured, free from warp, straight, clean and free from loose knots.

Where metal forms are used for formwork they shall be of the type strengthened by intermediate ribs or cross bracing.

Moving formwork may be used where in the opinion of the Project Manager it is appropriate.

304.2 Sawn Formwork

Sawn formwork shall produce an ordinary standard of finish consistent with normal good practice for use where the face of the finished concrete will not be exposed. The face in contact with the concrete shall consist of sawn timber boards, sheet metal or other approved material.

304.3 Wrought Formwork

Wrought formwork for use on exposed faces and water retaining faces shall produce a high standard of finish consistent with the best practice. The face in contact with the concrete shall consist of wrought and thickened boards tongued and grooved of not less than 30 mm finished thickness, framed plywood or metal panels or other approved material. Joints between boards and/or panels shall be arranged in a uniform pattern.

304.4 Special Wrought Formwork

Special wrought formwork shall provide the highest standard of finish where the face of the finished concrete is to form a particular feature. The face in contact with the concrete shall consist of large smooth sheets, unless otherwise specified, arranged in an approved uniform pattern, with joints coinciding with possible architectural features, sills, window heads, or changes in direction or surface. Accurate alignment of all joints shall be maintained. Wrought boarding and standard steel panels shall not be used unless specially faced.

304.5 Tolerances

Unless otherwise indicated on the drawings, the tolerances of the finished concrete with respect to the dimensions shown on the drawings shall not exceed the limits set out in Table 3.5.

(viii) Table 3.5 Tolerances of Dimensions for Finished Concrete

Items	Tolerances (mm)
Overall dimensions and Levels	±5
Column sizes	±5
) Beam sizes	
Vertical lines out of plumb	5 mm ± 15 mm in every 15 m height

Except that in the case of Sawn Formwork the dimensions of the finished concrete shall be not less than those shown on the drawings.

304.6 Striking and Removal

The recommendations set out in Table 3.6 are given as a minimum requirement for striking formwork:-

(ix) Table 3.6 Striking of Formwork

Item	Sulphate Resisting and Ordinary Portland Cement CEM I to KS 1725 Normal Weather (16°C and above)	Rapid Hardening Cement Normal Weather (16°C and above) Days	Portland Pozzolana Cementor CEM IV to KS 1725
Beam Sides, Walls, Columns	1	1	1
Slabs (props left under)	4	3	5
Beam Soffits (props left under)	7	5	9
Removal of props to slabs	8	5	10
Removal of props to beams	16	8	18.5
Shafts and Tunnels	1	1	1.5

The removal of props to slabs and beams shall, if directed by the Project Manager, be subject to satisfactory results of the relevant 7 day cube crushing tests.

The above striking times are for normal conditions and before deciding on the actual time for each case, the Contractor shall consider and extend the period as tabled if:-

- (a) the span of the structural member under consideration exceeds 6 metres for beams and 3 metres for slabs. An additional period of one day for each 500 mm of additional span shall then be allowed;
- (b) the dead load of the structural member under consideration forms a large proportion of the total design load;
- (c) constructional loads coming on to the structural member under consideration are being placed soon after the concreting operations and these loads form a large proportion of the total design load;
- (d) the setting of the concrete has been retarded for any reasons;
- (e) the temperature falls below 8°C. An additional period of half a day shall be added for each day on which the temperature falls below 8°C. For temperatures falling below 3°C the additional period to be added shall be one day for each day on which the temperature falls below 3°C;
- (f) any combination of the above points and other considerations which would call for such a precaution to be taken.
- (g) the span concerned is part of a continuous spanning system and the adjacent two spans have not been cured sufficiently.

Information regarding paragraph (b) above will be supplied by the Project Manager; any other design information relevant to the above shall be obtained by the Contractor from the Project Manager.

305 Concreting

305.1 Requirements

The finished concrete shall be dense, durable, impervious to the ingress of water, free from cracks and honeycombing, and resistant to wear and mild chemical attack. Special concretes will be the subject of their own particular sections of Special Concrete.

305.2 Transporting

Concrete shall be transported to the place of final deposit by approved means.

Barrows, spades and other equipment used in the process of transporting concrete shall be thoroughly cleaned before each day's work or after a long interruption and they shall be free from hardened concrete.

Concrete shall be transported as soon as possible after mixing, by methods which will prevent the segregation, loss or contamination of the ingredients.

Proper bridging arrangements for traffic over reinforcement shall be provided so that the reinforcement is not distorted, damaged or displaced.

Where approval is obtained for concrete to be conveyed by chutes, these shall have a slope (not exceeding 1 vertical to 2 horizontal) such as to ensure a continuous flow of concrete. Additional water shall not be introduced to assist the flow. If deposition is to be intermittent the chute shall be arranged to discharge into a storage hopper. In no case will a clear fall of more than 1 m be permitted at the discharge end of the chute.

Where approval is obtained for pumping the concrete, the pump manufacturer's recommendations shall be followed. The pumps used shall be of adequate capacity and power to ensure delivery of a continuous supply. The Contractor shall provide adequate alternative arrangements for transporting the concrete in case of a breakdown of the pumping equipment.

Wherever transport of concrete is interrupted for any length of time (periods of over half an hour shall be treated as such) the chutes, pumps, pipes and any other means of distribution shall be thoroughly flushed out and cleaned. These shall also be flushed out immediately prior to resumption of concreting and shall be kept free from hardened concrete. All washwater used shall be discharged outside the formwork and clear of any freshly placed concrete.

305.3 Placing and Compaction

No concrete shall be placed until the Contractor has obtained approval to do so from the Project Manager. When the Contractor intends to place concrete he shall inform the Project Manager in sufficient time to enable him to inspect the reinforcement, formwork and surface on which the concrete is to be placed and the Contractor shall provide all facilities for such inspection.

This approval shall be sought by presenting two copies of the completed "Structural Concrete Approval Form" (SCAF) to the Project Manager's Representative at least 24 hours before intending to concrete. (See sample page 23).

Concrete shall be placed within 30 minutes of mixing, to uniform level, in layers not exceeding 500 mm deep in such manner as to avoid segregation, and each layer shall be compacted by means of approved vibrators to form a dense material free from honeycombing and other blemishes. Compaction by hand may be used only with the prior approval of the Project Manager.

At least one internal vibrator shall be operated for every four cubic metres of concrete placed per hour and at least one spare vibrator for every three shall be maintained on Site in case of breakdown during concreting operations.

Vibration time, the effective radius and other vibration characteristics shall be in accordance with the vibrator manufacturer's recommendations.

If internal vibrators are used, they shall be withdrawn immediately when water or a thin film of mortar begins to appear on the surface of the concrete. Withdrawal shall be carried out slowly to avoid cavitation.

Internal vibrators shall not be inserted between layers of reinforcement less than one and one half times the diameter of the vibrators apart. Contact between vibrators and reinforcement and vibrators and formwork shall be avoided.

Vibrators shall not be used to move concrete from place to place in the formwork.

Where two distinct batches of concrete, placed at different periods of time and forming part of the same concreting operation are required to be formed monolithically with each other, the more mature concrete shall be penetrated by the vibrator to a sufficient depth to effect plastic movement between the two batches. Where the concrete does not respond to the action of the vibrator, it shall be deemed to have set, and no further disturbance will be permitted. Unless otherwise instructed by the Project Manager the condition shall be treated as for a "stoppage of work" and the marrying up of the two concretes shall be effected only when both concretes have properly set.

If external vibrators are used, the formwork shall be strong enough to withstand the forces of vibration.

Temporary or permanent stoppages of work shall be made only against stop ends (Clause 305).

Unless otherwise specified, before placing new concrete against concrete which has already hardened, the face of the older concrete shall be prepared by the removal of any laitance and loose aggregate, and shall be cleaned by a jet of compressed air.

When displacers are permitted to be used they shall be so placed that no displacer is within 300 mm of any finished face or within 500 mm of any other displacer. On completion of any lift, displacers shall be so arranged that they project for half their height above the surface.

STRUCTURAL CONCRETE APPROVAL FORM (SCAF)

(To be filled in duplicate before any concrete pour)

Contract Details

Job _____ Job No _____

Contractor _____ Site Engineer _____

Section and Concrete Details

Section / Block _____

Level _____ Member _____

Date / Time of Request _____ Date / Time of Pour _____

Concrete Class _____ Mix: Design / Nominal (delete one) Batching: Site / Ready Mix

(delete one) Check List

Description of Check	Checked	Remarks
Reinforcement Fixing		
Chairs / Links, etc.		
Reinforcement Cover		
Shutters / Stop ends		
Shutter Props		
Tie Bolts		
Plumbness / Slope		
Dimensions		
Line and Level		
Preparation hacking of joints		
Water Stops		
Moulds for Cubes		
Materials for Curing		
Any other checks (specify)		

Approval

Approved ☐Not Approved ☐

Date: _____ Signature: _____

Note: Approval by the Project Manager or his Representative does not relieve the Contractor of any of his contractual obligations.

305.4 Concreting in Deep Lifts

(i) Limitations

Any height exceeding 2.5 m from which concrete is poured into formwork to form sections of wall will be considered within the terms of this Clause.

Concrete in columns may be placed to a height of 4.0 m with careful placing and vibration and satisfactory results. Where the height of the column exceeds 4.0 m suitable openings must be left in the shutters so that the maximum lift is not exceeded.

Deep lift construction will not be permitted where the reinforcing bars are to be placed closer than 100 mm to one another in any direction or, where the clear width at the point of admitting the concrete between one layer of reinforcement and another (or in the case of singly reinforced walls between reinforcement and formwork) is less than 200 mm.

The method shall only be used where trial sections revealed that, in the Project Manager's opinion it can be satisfactorily employed, in which case the requirements of this Specification shall apply except where they are in conflict with the requirements of this particular clause, when the latter shall prevail.

(ii) Concrete

In order to prevent segregation of aggregates, concrete mixes shall be designed for increased cohesion, or, where suitable, on a gap-graded basis. The use of approved admixtures may be made to achieve this end (302).

At the same time, the mix shall be such as to limit the amount of bleeding in the concrete, and where in the opinion of the Project Manager the quantity of free water rising to the surface is excessive, the mix shall be corrected before further concreting is undertaken.

In order to offset any increase in the water-cement ratio at the upper levels, the Project Manager may require the concrete mix to be modified for the upper depositions.

A slump of 80 mm shall not be exceeded.

(iii) Reinforcement

In order that reinforcement is not distorted or displaced during construction as a result of it being used for gaining access in or out of the formwork, all intersections of vertical and horizontal steel shall be properly fastened.

All obstructions caused by spacer blocks or chairs shall be eliminated so as to permit an unobstructed passage for the concrete to the bottom of the formwork. The Contractor may use sliding timber spacers instead of fixed concrete or plastic spacer blocks to position the reinforcement.

(iv) Formwork

In view of the high pressures to be expected from this form of construction extra attention shall be paid to the strength and stability of the formwork, to the prevention of loss of grout, and to the prevention of displacement of adjacent panels.

The use of through-bolts and other accessories which might interfere with the free passage of concrete between and around the reinforcement shall be reduced to a minimum by the use of properly designed formwork.

(v) Concreting

Particular attention shall be paid to the concreting of the initial sections at the bottom of the formwork to prevent segregation caused by rebound from the hard surface of the kicker, base and/or lower sections. The initial depositions shall therefore be made by using trunking methods, or by placing the concrete through openings formed in the sides of the formwork. Such openings shall not be higher from the hard surface than 2.5m.

In order to reduce differential settlement, and consequently, cracking between two sections of concrete placed at different intervals of time, concreting between one section and another shall be carried out on a gap-construction basis (Clause 305). The gap shall subsequently be concreted in distinct lifts each not exceeding 2.5m in height. For the same reason, when concreting two adjacent sections placed at the same time but of different heights (e.g. where boxing out is included), the difference in height shall not exceed 15% of the height of the deeper section.

Concreting from the upper level of the formwork shall be carried out in such manner as to ensure that concrete is admitted centrally between the faces of the formwork. For this purpose the Contractor shall make use of trunking or shall use funnel-shaped hoppers extending for a distance of not less than 1.5 m into the formwork. A sufficient number of such hoppers shall be provided, and/or they shall be capable of movement along the length of the formwork, to enable the concrete to be placed in contiguous heaps at the base of the pour. Such heaps shall not exceed 460 mm in height.

Where excessive bleeding is in evidence, the excess water shall be removed before placing further concrete.

(vi) Compaction

Compaction shall be carried out where possible by manual operation of poker vibrators within the formwork. Where this is not possible poker vibrators shall be suspended in sufficient numbers to ensure uniform compaction along the length of wall receiving the concrete, without the need for their withdrawal and re-insertion. The means of suspension shall be such that the vibrators may be progressively and systematically lifted as the concreting proceeds to ensure that every section of placed concrete is married into adjacent and underlying sections.

The use of vibrators to reposition deposited concrete is prohibited. Surface vibrators attached to the formwork may be used only to supplement the main means of compaction.

305.5 Continuous Concreting

Where the Contractor desires to use continuous concreting method in large sections (rafts and walls), he shall submit a written request to the Project Manager for approval. In the request he shall attach details which shall include but not be limited to the following :-

- Total amount of concrete to be placed in the shift.
- Stock of approved concrete materials on site.
- Capacity of the batching plant.
- Number and type of truck mixers to be deployed for the exercise and movement logistics.
- Number of skilled and other manpower to be deployed for the exercise in shifts.

- Number and capacity of plant to be used in placing concrete (pumps, vibrators, buckets, etc).
- Method(s) of monitoring and dealing with the heat of hydration.
- Details of protection against rain and floodwaters and how to cope with it.

The Project Manager shall consider the above details and other parameters (e.g. weather, satisfactory records of cube test results, availability of adequate working sections where reinforcement placement and the necessary formwork have been approved etc), before making his decision. The Project Manager may order that additional concrete cube moulds be made available as well as arrangements be made for cube crushing with an approved laboratory to cope with the increased demand.

The Project Manager may order that the concreting works be stopped immediately if in his opinion the quality of the works is threatened for whatever reason.

305.6 Hot Weather Concreting (for temperatures above 20 Degrees Centigrade)

Concreting shall not be permitted if its temperature at placing is in excess of 35°C. In order to maintain the temperature of the concrete below this value the following precautions shall be taken wholly or in part as instructed by the Project Manager:-

- (i) All aggregate stockpiles, water lines and tanks as well as the mixer shall be protected from the direct rays of the sun;
- (ii) Coarse aggregate shall be cooled by constant watering where possible;
- (iii) Mixing water shall be cooled by the addition of ice to the storage tanks where necessary;
- (iv) Rapid-hardening cement shall not be used;
- (v) Where the above precautions are inadequate concreting shall be carried out during the cooler parts of the day or during the night as may be directed by the Project Manager.

When the air temperature is above 20°C loss of mixing water by evaporation shall be considered in arriving at the amount of water to be added to the mix (Clause 302). In order to maintain the water/cement ratio within permissible limits an approved water-reducing agent shall be included in the mix (Clause 302).

The maximum water/cement ratios indicated in Clause 302 may be increased with the Project Manager's permission by 0.05 (or 2.5 litres/50 kg of cement) during mixing, but on no account shall water be added to concrete directly or indirectly once it has left the mixer.

In order to reduce premature drying of the concrete during transporting and placing, all chutes, formwork and reinforcement shall be cooled by watering when possible, or shall otherwise be protected from the direct rays of the sun. Any water so used shall be removed by jetting with compressed air before placing the concrete in close contact.

As soon as possible after concreting, the formwork shall be stripped (Clause 304) and the surface of the concrete shall be treated in accordance with Clause 305.

Where drying winds are encountered, wind shields shall be positioned as directed by the Project Manager to protect exposed surfaces of the curing concrete.

305.7 Wet Weather Concreting

Concreting during periods of constant rain shall not be permitted unless aggregate stockpiles, mixers and transporting equipment, and the areas to be concreted are adequately covered.

During showery weather, the Contractor shall ensure that work can be concluded at short notice by the provision of stop ends. On no account shall work be terminated before each section, between one stop end and another, is complete. Adequate covering shall be provided to protect newly placed concrete from the rain.

305.8 Holes, Cavities and Fixings

The Contractor shall be responsible for the co-ordination of all requirements of his Sub-contractors as regards provision of holes, chases, cavities and fixings and shall, if required by the Project Manager, prepare drawings giving details of his and his Sub-contractor's requirements and shall send copies of such drawings to the Project Manager prior to construction.

Holes, etc. shall be accurately marked and boxed-out for before concreting operations commence and, without the Project Manager's prior approval, no such holes, etc. shall be formed after the concrete has set.

Where bars, if placed to specified spacing would foul holes of size less than 250 mm x 250 mm the full length of the bar shall be moved to one side and in the case of holes exceeding 250 mm x 250 mm the bars shall be cut on site and lapped with additional equivalent bars, or as otherwise indicated on the drawings.

Wherever possible, the Contractor shall build in all pipework, ironwork, etc. which passes through walls and floors, and the pipework, ironwork, etc. shall first be thoroughly cleaned and freed from any deleterious matter, and every care shall be taken to ensure that it is thoroughly encased in concrete.

Unless otherwise instructed by the Project Manager all electrical conduits to be positioned within the reinforced concrete shall be fixed inside the steel cages of beams and between the top and bottom steel layers in slabs and similar members.

The proposed position of all conduits 25 mm and over in diameter which are to be enclosed in the concrete shall be shown accurately on a plan to be submitted to the Project Manager, whose approval shall be obtained before any such conduit is placed.

Bolts, hooks and other fixings shall be embedded in concrete, or holes shall be drilled and fitted with threaded expanding anchors to receive the bolts. The Contractor shall ensure that bolts, hooks, etc. are accurately positioned. Holding down bolts for machinery shall be set by means of a template.

Where brick or stonework is to form a facing to the concrete or where the end of a brick or stone wall butts against a concrete face, galvanised metal ties of approved manufacture to BS 1243 shall be incorporated. The distance between ties shall be gauged with due regard for the bonding of the walls, and at intervals required by the Project Manager.

305.9 Protection and Curing

Newly placed concrete shall be protected by approved means from rain, drying winds, sun and contact with substances which can adversely affect it.

No traffic or constructional loads shall be permitted on newly placed concrete until it has hardened sufficiently to take such traffic or load, and only then with the approval of the Project Manager.

Concrete shall at no time be subjected to loading (including its own mass) including compressive stress until it has reached 0.40 of its specified 28 day strength.

Any concrete surfaces, risers and treads of stairways which might be damaged during the construction of the Works shall be adequately protected.

All structural concrete shall be cured using methods approved by the Project Manager.

The method of curing shall prevent loss of moisture from the concrete. Immediately after compaction and for 7 days thereafter concrete shall be protected against harmful effects of weather, including rain, rapid temperature changes and from drying out.

The curing time shall be the number of days given in Table 3.7 unless the average temperature of the concrete during the required number of days falls below 10°C in which case the period of curing shall be extended until the maturity of the concrete reaches the value given in the table.

(x)

(xi) Table 3.7 Normal Curing Methods

Minimum period of protection for different types of cement

Conditions under which concrete is maturing	Number of days (where the average temperatures of the concrete exceeds 10°C during the whole of the period)			rs calculated ete in hours of		degrees the average te exceeds -
	Type IV	Type I or Type V	Type III	Type IV	Type I or Type V	
1. Hot weather or drying winds	7	4	2	3500	2000	
2. Conditions not covered by 1.	4	2	1	2000	1000	
	Type IV Cement	-	Low Heat Portland Cement/Portland - Pozzolana			
	Type I	-	Ordinary Portland Cement			
	Type V	-	Sulphate-resisting Portland Cement			
	Type III	-	Rapid-hardening Portland Cement			
	Hot weather	-	Temperature over 16°C			

Curing shall be carried out using either of the following basic methods, or any other method agreed with the Project Manager. Methods involving the use of dampened hessian coverings shall not be used. The method adopted for any particular situation shall be agreed with the Project Manager.

A. Membrane Applied by Spray

Liquid membrane compounds shall be applied to moist concrete surfaces as follows:-

(i) Unformed Surfaces

The compound shall be applied immediately after the free water has left the surface.

(ii) Formed Surfaces

The compound shall be applied immediately after removing the forms. If there is appreciable drying, the surface shall be mist sprayed with water to produce a uniformly damp appearance before the compound is applied.

The compound shall be applied in one or two separate applications to produce complete and uniform coverage of the surface. If the compound is applied in two increments, the second application shall follow the first within 30 minutes. The method and rate of application shall be in accordance with the compound manufacturer's instructions.

If rain falls on the newly coated surface before the film has dried sufficiently to resist damage, or if the film is damaged in any other manner, a new coat of compound shall be applied to the affected area equal in curing value to that originally applied.

Compound applied to construction joint surfaces, or to other surfaces to which concrete is to be bonded, shall be removed prior to placing the fresh concrete.

Depending on the surface to which it is to be applied the compound shall conform to the following requirements of AASHTO M148.

(i) Exposed and vertical concrete surfaces - Type I-D (clear compound with fugitive dye).

(ii) Unexposed top surfaces of foundations and superstructures - Type 2 (white pigmented).

B. Polythene Sheeting

The concrete surfaces shall be covered with white polythene sheeting as follows:-

(i) Unformed Surfaces

The sheeting shall be laid over the surface as soon as possible without marring the surface, and not until initial stiffening has taken place if a brushed or tamped finish is required.

(ii) Formed Surfaces

The surfaces shall be covered immediately after the removal of the forms.

The sheeting may be in contact with the concrete or made into portable shelters on light weight frames. In both cases, the sheeting shall be jointed and sealed against the concrete surfaces to prevent wind blowing between the sheeting and the concrete.

The white polythene sheet shall conform with the requirements of AASHTO M171. On no account shall clear or any other colour of sheeting be used.

C. Other Curing Methods

These shall be agreed with the Project Manager. Methods involving the use of damped hessian coverings shall not be used, unless at least 2 layers of continuous hessian are used and they are kept continuously wet and protected from winds which cause accelerated drying.

Where the thickness of concrete placed exceeds 1.5 m, the Contractor shall submit for the Project Manager's approval proposals to ensure that, during the curing period:-

- (a) the rate of rise of temperature in the concrete does not exceed 15°C per hour for the first 3 hours;
- (b) thereafter the rate of rise and fall of temperature in the concrete does not exceed 35°C per hour;
- (c) the maximum temperature in the concrete does not exceed 70°C; and
- (d) the maximum difference in temperature between the core and the surface of the concrete does not exceed 20°C.

The proposals shall include consideration of:-

- (a) concrete mix design;
- temperature of mix at time of placing;
- (c) method of curing.

Where required by the Project Manager, the Contractor shall carry out temperature measurements in the concrete. The method and procedure of temperature measurement shall be agreed with the Project Manager.

305.10 Joints

(i) Construction Joints

The position of construction joints, when not shown on the Drawings or otherwise required by this Specification, shall be decided on site having regard to the plant and labour made available by the

Contractor for the manufacture, placing and compaction of the concrete as well as its curing, the climatic conditions prevailing at the time of concreting, the nature and size of the formwork, and the conditions of operation of the work. Waterstop shall be provided to all construction joints on water retaining or excluding structures. The Contractor shall submit his proposals to the Project Manager for his approval at least fourteen days before commencing the work.

Construction joint surfaces shall be treated by the "wash-off" method explained below, except where it cannot be practically effected, in which case they shall be treated in accordance with Clause 305 as for the placing of new concrete against hardened concrete.

When expanded metal lathing is used for the formation of construction joints a rebate will not be required to be formed. The expanded metal lathing shall be left in the work and shall not extend closer to the finished surface of the concrete than 25 mm. It shall be securely fixed to the reinforcement. The following particular requirements shall also be observed:-

* Slabs supported on the ground

In order to ensure control in the placing of concrete the Contractor shall provide control boards to form panels not larger than 15 m² in area. These shall be lifted as the concreting proceeds except where they are of expanded metal in which case they may be left in position as part of the permanent works, provided that they shall not extend closer to the finished surface of the concrete than 25 mm. In the event of a breakdown in the supply of concrete the Contractor shall ensure that an alternative supply of concrete is made available (to finish the work against the control boards acting as stop ends). The joint so formed shall then be treated as a construction joint. Where Ready-mixed concrete is permitted the control boards shall be positioned so as to enclose a volume of concrete equal to that delivered by each truck.

Construction joints and control joints shall be formed normal to the surface of the retained concrete.

* Suspended Beams and Slabs

T-beams shall be formed to their full depth integrally with the adjacent slab and without horizontal joints.

* Columns

Where kickers are indicated on the drawings these shall be cast together with the slab or beam below. On no account shall kickers be cast as a separate operation. Alternatively, the Contractor may adopt "kickerless construction" methods providing he can satisfy the Project Manager that his system is reliable and does not compromise workmanship.

* Walls

Horizontal construction joints in walls shall be formed along straight lines coinciding with the full height of the formwork. The height of the formwork thus controlling the height of the pour shall be determined with reference to the availability of concrete, the size and amount of reinforcement and the means of compaction available.

Unless otherwise indicated on the drawings or otherwise permitted by the Project Manager for the construction of circular tanks, concreting shall be carried out continuously for the full circumference without vertical joints. Where permission is granted for the use of vertical joints the Project Manager may order, at no extra cost to the Employer, the inclusion of an approved type of water stop.

In the case of rectangular tanks, vertical joints shall not be positioned closer to any corner than one metre. They shall be formed with properly rebated stop ends or, where conditions permit, by the use of expanded metal lathing. Unreinforced manholes shall be constructed without vertical joints.

(ii) The "Wash-off Method" of preparing Construction Joints

As soon as possible after concreting, and while the surface is still green, the surface of the concrete forming the joint shall be freed of loose aggregate and sprayed with a fine spray of water to prevent the formation of laitance. Subsequently all excess water shall be removed by a jet of compressed air and the surface left clean to receive further concrete.

Where expanded metal lathing is used for construction joints, this method of surface preparation shall be used in every case.

(iii) Movement Joints

These shall include contraction and expansion joints and shall be as indicated on the drawings.

Contraction joints will be either full contraction joints or partial contraction joints. Where partial contraction joints are specified a period of at least five days shall elapse between the concreting of the section on each side of the joint.

Where the drawings indicate a contraction gap to be formed in any panel (this gap will not exceed one metre), concreting on either side of the gap shall be carried out so as to form partial contraction joints at each side of the gap. Prior to the concreting of the gap section, the joint surfaces shall be cleaned but otherwise left untreated. The concreting of the gap section shall not be carried out until a period of at least five days has elapsed after completion of the adjacent sections.

Alternate panel construction (other than contraction gap construction outlined above) will be permitted only with the approval of the Project Manager, or in those cases where either the reinforcement is not continuous through the joint or where the panels are separated by expansion or contraction joints.

Unless otherwise specified or permitted by the Project Manager all waterstop shall consist of rubber or PVC. Jointing of waterstop shall be by vulcanising, except where PVC is specified or permitted in which case joints shall be by fusing or welding. Materials shall be obtained from an approved manufacturer whose recommendations as to jointing shall be fully complied with.

(iv) Waterstop and Jointing Materials

Waterstop and jointing materials shall be obtained from an approved manufacturer.

All waterstop and jointing materials which are not required for immediate use shall be stored at all times in a cool damp place.

Waterstop shall be manufactured of rubber or PVC (polyvinylchloride) as shown on the drawings, and shall be of the type and size shown on the drawings. Site joints shall be made strictly in accordance with the manufacturer's instructions and all intersections and junctions shall be obtained prefabricated from the approved manufacturer.

Joint filler shall be manufactured of natural bonded cork or other approved material which remains serviceable when wet. Joint filler shall be cut and trimmed accurately to suit the joint profile and shall be maintained accurately in position by means of an approved adhesive. The compressibility of the filler shall be such that it can be compressed to 50% thickness with a pressure of not less than 0.07 N/mm square and no greater than 0.4 N/mm square. After 50% compression, the material should recover to at least 70% original thickness within 30 minutes. On no account shall fibreboard or similar be used as filler.

Joint sealing compounds shall be approved polysulphide based compounds suitable for sealing joints in horizontal and vertical/sloping concrete surfaces as appropriate. Sealing compounds shall be applied

strictly in accordance with the manufacturer's instructions and shall completely fill the joint recess. Surface primers shall be from the same manufacturer as the sealants themselves. Joint sealing compounds shall be entirely suitable for contact with potable water where these are used in water retaining structures.

Waterstop shall be located and maintained accurately in position and details of the proposed method of fixing shall be submitted to the Project Manager for approval. On no account shall waterstop be secured by nails or by any other means involving puncture of or damage to the waterstop material unless purpose made nailing flanges are incorporated in the design of the waterstop.

(v) Slip Membrane

The slip membrane shall be "slipstrip" as supplied by Serviced Limited, Ajax Avenue, Slough, Berkshire, UK or similar approved material. The slip membrane shall be not less than 1.5 mm thick and shall be a plastic preformed strip with low coefficient of friction specifically manufactured for use as a separating membrane in sliding joints between concrete surfaces. Each sliding joint shall comprise two layers of the membrane unless otherwise shown on the drawings.

The concrete surface to which the slip membrane is to be fixed shall be finished with a steel float to provide a smooth true surface free from dust and loose particles.

(vi) Expandafoam

Expandafoam shall be as supplied by Expandite Limited, 1-9 Chase Road, London, NW10 6PS, UK or similar approved material. Expandafoam is a closed cell flexible polyethylene joint filler used where a readily compressible low load transfer joint filler is required. Expandafoam shall be fixed in position using a suitable adhesive.

305.11 Finishes - General

All exposed faces of concrete unless otherwise specified shall be hard, smooth and free from honeycombing, air and water holes and other blemishes.

All projecting imperfections shall be rubbed down with carborundum stone or by other approved means and grit and dust therefrom shall be thoroughly washed off with clean water.

Surface Finishes

(a) Wood float finishes shall be formed by smooth floating the accurately levelled and screeded surface. Care shall be taken to ensure that the concrete is worked no more than is necessary to produce a uniform surface free from screed marks.

(b) Steel trowel finishes shall be formed while the concrete is still wet by means of a steel trowel applied to an accurately levelled and screeded surface (see also Clause 307).

(c) Granolithic finishes shall conform to the recommendations laid down in "Specification for Granolithic floor toppings laid in-situ concrete", as published by the UK Cement and Concrete Association with special reference to monolithic construction.

(d) Screeded finishes shall be formed by levelling and screeding the concrete to produce a uniform, plain or ridged surface as specified; surface hardeners shall be applied strictly in accordance

with the manufacturer's recommendations.

- (e) Bush-hammered or pattern-worked finishes.

When exposed aggregate is to be the surface texture, the Contractor shall ensure that a uniform distribution of the coarse aggregate takes place at the face. The formwork shall be removed as soon as possible from the face to be treated; the surface shall be thoroughly wetted and wire brushed, and bush-hammered or pattern-worked as and when instructed. Surface retarders shall be used only when permitted by the Project Manager.

Bush-hammering or pattern-working shall not be relied upon to obscure any defects in the concrete face which arise from formwork imperfections.

Making Good

On no account shall any faulty honeycombed or otherwise defective concrete be repaired or patched until the Project Manager has made an inspection and issued instructions for the repair.

Honeycombed or damaged surfaces of concrete, which in the opinion of the Project Manager, are not such as to warrant the cutting out and replacement of the concrete, shall be made good as soon as possible after removal of the formwork as follows:-

1:1.5 Portland Cement and sand mixture shall be worked into the pores over the whole surface with a fine carborundum float in such a manner that no more material is left on the concrete face than is necessary to fill the pores completely so that a uniformly smooth and dense surface of uniform colour is finally presented.

Removal and Replacement of Unsatisfactory Concrete

The Contractor shall on the Project Manager's instructions to do so cut out and replace any concrete in any part of the structure if in the Project Manager's opinion:-

- (a) the concrete does not conform to the Specification, or
- (b) deleterious materials or materials which are likely to produce harmful effects have been included in the concrete, or
- (c) the honeycombed or damaged surfaces are too extensive, or
- (d) the finished concrete sizes are not in accordance with the drawings within permissible tolerances, or
- (e) the setting-out is incorrect, or
- (f) the steel cover has not been maintained, or
- (g) the protection, including curing, of the concrete during the construction was inadequate, resulting in damage, or
- (h) the work of making good or other remedial measures the Project Manager may indicate are not carried out to his satisfaction, or

- (i) undue deformation of or damage to the works has taken place due to inadequate formwork, or to premature traffic or to excessive loading, or
- (j) any combination of the above points has taken place resulting in unsatisfactory work.

306 Testing

306.1 Sampling and Testing - (see also Clauses 301 and 302)

The Contractor shall provide on the Site equipment, staff and labour for carrying out the sampling and testing outlined in columns 3 and 4 of Table 3.8, and he shall carry out any or all of these tests at such times and with such frequency as may be requested by the Project Manager.

All equipment shall be calibrated and checked from time to time by an approved agency, as the Project Manager may require.

The Contractor shall provide all samples required by the Project Manager. Those samples to be tested in an offsite laboratory shall be carefully forwarded by the Contractor to an approved laboratory. Results of laboratory and site tests shall be kept on site and copies of all test reports shall be forwarded in duplicate to the Project Manager.

Each cube shall be marked with a distinguishing number (numbers to run consecutively) and the date, and a record shall be kept on Site giving the following particulars:-

- (a) Cube No.
- (b) Date and time made
- (c) Temperature and weather conditions
- (d) Location in work
- (e) 7-day Test

Date :

Strength

- (f) 28-day Test

Date :

Strength

Cubes shall be forwarded, carriage paid, to an approved Testing laboratory in time to be tested two at 7 days and two at 28 days. No cube shall be dispatched within 3 days of casting.

Authentic copies of all Work Test results shall be forwarded to the Project Manager directly from the testing laboratory and one shall be retained on the site. The test certificates shall indicate all properties as required by BS 1881.

The Contractor must allow in his rates for concrete test cubes for all expenses in connection with the preparation and conveyance to the Testing Laboratory and testing of test cubes and no claim in respect of his failure to do so will be entertained.

Any batch of concrete which fails to achieve the required characteristic strength shall be removed and made good in accordance with this Specification. The Contractor shall carry out all such work at his own cost.

Frequency of tests and the number of samples required will be governed by the results of the previous tests, the quality of the materials revealed during the tests, and the uniformity of that quality (see Clause 302). Should it become evident that the quality of concrete is deteriorating the Project Manager may require additional samples to be taken and test cubes to be made and tested to determine the cause.

306.2 Loading Tests

The Project Manager may direct that a loading test be made on the works or any part thereof if he deems such test to be necessary for one or more of the following reasons:-

- (a) failure of "Site Cubes" to attain the strength requirements of Clause 302;
- (b) premature removal of formwork;
- (c) overloading of structure during construction;
- (d) improper compaction and/or curing of concrete;
- (e) any other circumstances attributable to alleged negligence on the part of the Contractor, which, in the opinion of the Project Manager, may result in a structure being of less than the required strength;

If the loading test is ordered to be made solely or in part for reasons (a) to (d) the test shall be made at the Contractor's own cost.

If the loading test is ordered to be made for reason (e), the Contractor shall be reimbursed for the cost of the test if the result is satisfactory. No extensions to the Contract Duration shall be granted for delays and disruption resulting from these tests.

Loading test shall be carried out in accordance with the requirements of BS 8110 – 2 Section 9.

If the results of the test are not satisfactory, the Project Manager will direct that the part of the work concerned be taken down or removed and reconstructed to comply with the Specification, or that such other remedial measures as he may think fit be taken to make the work acceptable and the Contractor shall carry out such work at his own cost.

(xii) Table 3.8 Sampling, Testing and Acceptance Standards

Materials	Test	Site Sampling	Testing	Accepted Standards	Remarks
1	2	3	4	5	6
Cement	Ordinary Portland Rapid Hardening Sulphate Resisting		BS 4550	BS 12 BS 12 BS 4027 KS1725	Manufacturer's Test Certificate
Aggregates	Description and Classification		BS 812 Sec 2	BS 882	
	Particle Size	BS 812 Sec 1	BS 812 Sec 3	BS 882)
	Particle Shape	BS 812 Sec 1	Visual and BS 812 Sec 3)
	Specific Gravity	BS 812 Sec 1	BS 812 Sec 3) Design
	Density	BS 812 Sec 1	BS 812 Sec 3) Requirements
	Voids	BS 812 Sec 1	BS 812 Sec 4)
	Absorption	BS 812 Sec 1	BS 812 Sec 4	BS 8007 Cl 6.2.2	See Freeze-thaw Test in this table
	Organic Impurities	BS 812 Sec 5			
	Moisture Content	BS 812 Sec 5			For adjustment of added water for concrete making
	Mechanical Properties	BS 812 Sec 6	BS 882		Ten per cent fines value
Water	Suitability	BS 3148	BS 3148	BS 3148	Not required for potable water
Concrete	Compacting Factor	BS 1881 Pt 101	BS 1881 Pt 103)
	Slump		BS 1881 Pt 102) Workability Test
)
)
	Crushing		BS 1881	BS 5328, BS 8110	Cube test
	Water Absorption		BS 1881 Pt 122	BS 7263	Precast concrete Clause 308
	Freeze-thaw	BS 1881	BS 812 Sec. 1		Durability test for aggregate not complying with moisture absorption requirements of BS

Materials	Test	Site Sampling	Testing	Accepted Standards	Remarks
1	2	3	4	5	6
					21.2
	Electrolytic Efflorescence				As required for salt-containing aggregate or saline water
	Cores	BS 1881 Pt 6 BS 1881 Pt 120	BS 1881 Pt 6 BS 1881 Pt 120	BS 1881 Pt 120 with ref to concrete strengths thi	See Clause 306
Admixers	Compatibility with cement	As required by Laboratory			Tests to be carried out by independent Laboratory as required

The Project Manager may also instruct the Contractor before a loading test takes place to take out cylindrical core specimens from the structures concerned and have them tested. The cutting equipment and the method of doing the work shall be to the Project Manager's approval. The specimens shall be dealt with in accordance with BS 1881. Prior to testing, the specimens shall be available for examination by the Project Manager. If the cores are ordered to be taken solely or in part for reasons (a) and (d) above, the work involved and the testing shall be made at the Contractor's own cost. If the cores are to be taken for reasons (b), (c) and (e) above, the Contractor will be reimbursed the cost if the loading test described in the previous paragraphs proves satisfactory.

307 Special Concrete

307.1 No-fines Concrete

No-fines concrete for use in subsoil drainage shall consist of a 1:8 cement/aggregate mix by volume. Aggregate shall be 20 mm to 10 mm graded with no more than 5% passing the 10 mm sieve. Only sufficient water shall be added to ensure complete coating of the aggregate. One half of this water shall be placed into the mixer first, after which the aggregate and cement shall be admitted. After partial mixing the balance of the water shall be added until a consistency of mix is achieved.

Preliminary tests shall be carried out on the site to prove the suitability of the finished concrete, and adjustments made to the proportions and or grading as may be required by the Project Manager.

307.2 Air-Entrained Concrete

Concrete for roads and those structures where specified, shall include an approved air-entraining agent capable of producing a 5% air-entrainment with a tolerance of 0.5% (Clause 302).

The mix shall be purposely designed, having regard for the nature of grading of the aggregates and air-entraining agent being used.

Preference shall be given to the use of air-entraining agents which can be administered in fixed calibrated amounts through a dependable mechanical dispenser or sachet, and which are added to the mixing water.

Frequent air meter tests shall be carried out and the consistency of the air-entrainment maintained to the above tolerances by adjustments in the mix, as may be necessary.

307.3 Concrete in Benching

Concreting for benching in manholes, pumping stations and works structures shall consist of Grade C25P concrete unless otherwise specified. It shall be placed with low workability to the approximate shape required and, while still green, shall be finished with not less than 50 mm of Grade C25P concrete to a steel trowelled finish and to the contours indicated on the drawings.

307.4 Ready Mixed Concrete

Unless otherwise stated the relevant clauses of BS 5328 shall apply.

Ready mixed concrete shall only be used with the prior approval of the Project Manager. The Contractor shall not be relieved of his obligation to provide concrete to the standard laid down in this Specification by

virtue of any approval given for the use of concrete supplied by others, and the Project Manager reserves the right to withdraw his approval at any time consequent on any deterioration in the quality of the Concrete, or unsatisfactory delivery or any other reason he considers detrimental to the Works.

Ready mixed concrete manufactured off the site shall be transported in a revolving drum and shall be continuously agitated until it is used in the work unless otherwise approved. The time interval between adding water to the drum and placing shall not exceed 90 minutes. The time interval between completion of mixing and placing shall comply with Clause 305.

307.5 Granolithic Concrete

Refer to Clause 305.

307.6 Pneumatically Applied Mortar (Gunite)

(i) Requirements

The pneumatic application of mortar shall be carried out only by Contractors experienced in this type of work and who are in possession of proper Plant and equipment. Nozzlemen employed on the works shall be skilled operators.

The finished product shall be dense, of even texture and colour, and to the requirements of strength, tolerance and finish set out in this Specification.

(ii) Strength

After curing, the mortar shall be capable of producing cored samples with a 28-day characteristic strength of not less than 27.5N/mm².

(iii) Materials

Sand, cement and water shall comply with the requirements of Clause 302 of this Specification except that the sand shall conform to the grading of Zone 2 of BS 882.

(iv) Proportions

The proportions to be used in the mix shall be determined with reference to the requirements outlined in sub-clause 307(i) and the mix shall be not weaker than one part of cement to four parts of sand by volume, having regard to the adjustments for bulking of the sand.

(v) Operation

Air and water pressures shall be such as to permit the proper application of the mortar, and shall be determined with reference to hose lengths and nozzle diameter.

Mortar rebound, recovered, cleaned and uncontaminated with extraneous matter, may be re-used but not for water-retaining structures. It shall be regarded as an equivalent volume of sand which shall not exceed 20 per cent of the total sand requirement. Rebound which has lodged in the formwork or between reinforcement shall be removed by compressed air.

Reinforcement shall be completely embedded in the mortar by the proper direction of the nozzle and the mortar shall be applied as a steady and uninterrupted flow from the nozzle.

Mortar application shall be discontinued at any section of the work where sagging of the mortar is in evidence.

(vi) Joints

These shall be formed by sloping the surface to a thin edge. Before applying new mortar, the surface shall be thoroughly wetted. Laitance shall be removed by the initial discharge of fresh mortar.

(vii) Tolerances

The thickness of applied mortar shall be not less than the dimensions shown on the Drawings nor greater than 10 mm over those dimensions, unless otherwise indicated on the Drawings or otherwise permitted.

(viii) Protection and Curing

Shall be carried out in accordance with the requirements of Clause 305.

(ix) Finishes

Unless otherwise specified all surfaces shall be brought to a granular textured finish by means of a wooden float.

(x) Cold Weather Work

No application of mortar shall be made against frozen surfaces nor when the air temperature is below 5oC.

(xi) Making Good

Any defective work shall be cut out immediately and made good with fresh mortar pneumatically applied.

307.7 Cement Grouts

Cement grout shall be mixed in the relevant proportions indicated in the following table using the minimum quantity of water to ensure the necessary fluidity and to render it capable of penetrating the work.

Class	Nominal Mix by Mass	
	Cement	Sand
G1	1	-
G2	1	3
G3	1	10

Cement grout shall be used within one hour of mixing, except where containing a retardant admixture.

307.8 Pumped Concrete

Where pumping of concrete is permitted to be used no relaxation of the requirements of this Specification will be permitted. Particular attention shall be paid to the proper grading of aggregates to prevent bleeding and/or segregation during the pumping operations. The inclusion of water-reducing additives or other materials, including flyash, to improve the flow characteristics of the concrete will only be permitted where it can be shown that they do not adversely affect the concrete either in the plastic phase or in the finished work.

308 Precast Concrete Units

308.1 Requirements

Unless otherwise agreed in writing by the Project Manager, all precast concrete units shall be manufactured on site and shall be true to dimension and shape, with true arises and with perfectly smooth exposed faces free from surface blemishes, air holes, crazing and other defects, whether developed before or after building-in. They shall comply with the appropriate BS. (Note: Coping blocks and similarly exposed units are particularly susceptible to crazing when the concrete is manufactured using high water/cement ratios)

The maximum size of coarse aggregate in precast concrete shall not exceed 20 mm except for thicknesses less than 75 mm where it shall not exceed 10 mm.

The compacting of precast concrete shall conform with requirements given elsewhere in this Specification except for thin slabs where use of immersion type vibrators is not practicable. The concrete in these slabs may be consolidated on a vibrating table or by any other methods approved by the Project Manager.

Steam curing of precast concrete will be permitted. The procedure for steam curing shall be subject to the approval of the Project Manager.

The precast work shall be made under cover and shall remain under the same for seven days. During this period and for a further seven days the concrete shall be shielded by sacking or other approved materials kept constantly wet. It shall then be stacked in the open for at least a further seven days to season before being set in position. Where steam curing is used these times may be reduced subject to the approval of the Project Manager.

Precast concrete units shall be constructed in individual forms. The method of handling the precast concrete units after casting, during curing and during transport and erection shall be subject to the approval of the Project Manager, providing that such approval shall not relieve the Contractor of responsibility for damage to precast concrete units resulting from careless handling.

Repair of damage to the precast concrete units, except for minor abrasions of the edges which will not impair the installation and/or appearance of the units, will not be permitted and the damaged units shall be replaced by the Contractor at his own expense.

Except where precast work is described as “fair face” or as having “exposed aggregate” or terrazzo finish the moulds shall be made of suitable strong sawn timber true in form to the shapes required. Unless otherwise described, faces are to be left rough from the sawn moulds.

Where precast work is described as “fair face” the moulds are to be made of metal or are to have metal or plywood linings or are to be other approved moulds which will produce a smooth dense fair face to the finished concrete suitable to receive a painted finish direct and free from all shutter marks, holes, pinnacles, etc. Where precast work is to have an “exposed aggregate” or terrazzo finish the moulds shall be constructed to the requirements given for moulds for “finished fair” work.

The method of achieving the exposed aggregate finish shall be “aggregate transfer” or other approved method.

308.2 Kerbs

Precast concrete kerb shall conform to BS 7263: Part 1: 1990, except that coarse aggregate shall conform to BS 882: 1983. Fine aggregate shall consist of sand resulting from the natural disintegration of rock.

Approved air-entraining agents may be permitted to be used providing that approved adjustments are made to the mix with regard to water and fine aggregate proportions (Clause 302). In such cases the moisture absorption limits set out in BS 340 may be neglected subject to the concrete satisfying the freeze thaw test laid down under the heading "Weir Blocks and Sills".

308.3 Paving Slabs

Paving slabs shall conform to BS 368 and shall be 50 mm thick unless otherwise specified.

308.4 Other Blocks

Blocks used for building work and filter bed walls shall conform to BS 6073: Part 1: 1981.

308.5 Wall Units

L-shaped wall units shall conform to the requirements of BS 8110. Where it is not intended to use coping blocks for the protection of the upper exposed surface of the units, the uppermost 150 mm, for the full width of the unit, shall be formed with concrete composed of aggregate complying with BS 882: 1992. Such concrete shall be formed integrally with the main body of the concrete.

308.6 Other Items

Manhole ring units, tapers, cover slabs, segments and concrete pipes are referred to under their particular heading.

309 Site Books And Standards

309.1 Instructions to be Recorded

The Contractor shall provide and keep permanently on the Site a numbered triplicate book wherein the Contractor shall record all instructions relating to concrete work issued by the Project Manager. One copy of every entry therein shall be sent to the Project Manager on the same day as the entry is made.

309.2 Site Diary

The Contractor shall provide and keep permanently on the Site a continuous entry diary wherein the Contractor shall record details of formwork, construction, placing of reinforcement, concreting and curing operations, striking of formwork, making good and daily temperature and weather conditions. This diary shall always be available for inspection by the Project Manager.

309.3 Copies of Standards and Codes

The Contractor shall provide and keep permanently on the Site copies of the following Standard Codes of Practice:-

BS 812
BS 882
BS 1881
BS 4466

BS 5328
BS 5628
BS 8007
BS 8110
KS1725

The Contractor shall in addition provide and keep permanently on the Site copies of such other Standards, Codes, Notes and Specifications as may be required by the Project Manager.

310 Water Retaining Structures - Special Clauses

Note: In the event of any differences between the "Special Clauses" and the previous Specification under Section 2.3 the provisions of these "Special Clauses" shall have precedence.

310.1 Making Good

The cement mortar used in filling recesses in the concrete formed by bobbins in connection with formwork shall contain an approved expanding admixture.

310.2 Construction Joints in Water Retaining Structures

In water retaining structures PVC waterstops not less than 130 mm wide manufactured by an approved manufacturer shall be built into all construction joints in external walls and construction joints in roofs of

potable water retaining structures. Construction joints shall be formed at positions agreed by the Project Manager.

The cost of forming construction joints shall be included by the Contractor in his general concrete rates.

310.3 Watertightness of Structures

The Contractor shall be solely responsible for the watertightness of structures and any remedial measures necessary.

310.4 Hydrophilic Rubber Sealer

Hydrophilic rubber sealer shall be co-extruded from chloroprene and hydrophilic rubbers into a cellular strip approximately 25 mm x 7 mm thick which expands as it absorbs water. The strip shall incorporate an expansion delay coating to prevent activation during setting of the surrounding concrete.

Hydrophilic rubber sealer shall be applied to the perimeter of all pipes to be built into concrete structures, to existing concrete walls and slabs at or below water levels which have been demolished and require extension, and to other locations as indicated on the Drawings.

The strip sealer shall be bonded to the pipe diameter or on to the face of demolished structures on to which new concrete is to be placed so as to be at least 100 mm from the wall surface. Where dowel bars are incorporated in bonding new concrete to old, the sealer shall be placed above the dowel bars on the "wet" side of the structure. Bonding shall be accomplished using proprietary neoprene or epoxy adhesives to ensure the sealer is not disturbed during placement of the concrete.

The sealing strip shall be from an approved supplier and application shall be strictly in accordance with the manufacturer's recommendations.

310.5 Waterproof Membranes for Concrete Roofs and Gutters

Concrete roofs and gutters shall be waterproofed by the provision of a membrane to be laid on top of the slab. The membrane shall be a cold applied preformed waterproof laminated layer comprising a HDPE carrier film with a solar reflective surface and a self-adhesive rubber bitumen compound complying with the requirements of BS 8102. The membrane shall exhibit a tear resistance of at least 250 N/mm when tested in accordance with ASTM D1004. Adhesion to primed concrete to itself shall exceed 1.75 N/mm when tested in accordance with ASTM D100, and a puncture resistance of 290 N 65 mm when tested in accordance with ASTM E154. Membranes shall exhibit a water resistance of not more than 0.14% after 24 hours when tested in accordance with ASTM D574. The contractor shall submit proposals for waterproof membranes for approval, together with manufacturer's catalogues and technical literature.

Waterproof membranes shall be installed entirely in accordance with the manufacturer's instructions. Membranes shall be continued up the internal face of the parapet wall and finished centrally under the coping. Adjacent strips of membrane shall be overlapped to provide a waterproof joint. The provision of a waterproof membrane on the roof slab shall not relieve the Contractor of his responsibilities to produce a waterproof roof slab which shall have successfully passed a watertightness test before the membrane is installed.

SECTION 4 PIPELINES, PIPEWORK**401 General****401.1 Equivalency of Goods, Materials and Plant**

Wherever reference is made in the Contract, including Specifications, Drawings and Bill of Quantities, to specified manufacturers or suppliers for the supply of goods, materials and plant for the Works, goods, materials and plant from alternative manufacturers and suppliers will be permitted, unless otherwise expressly stated in the Contract, providing these other goods, materials and plant are substantially equal or of a higher quality than those of the specified manufacturer or supplier and are approved in writing by the Project Manager. Differences between the specified goods, materials or plant and the proposed alternative shall be described in writing by the Contractor and submitted to the Project Manager, together with such manufacturer's or supplier's technical literature and samples as the Project Manager may reasonably require. At least 28 days prior to the date when the Contractor desires the Project Manager's consent. In the event the Project Manager determines that such proposed alternative goods, materials or plant do not ensure substantially equal or higher quality, the Contractor shall obtain the goods, materials or plant from the manufacturer of supplier specified in the Contract.

401.2 Materials

Any material which will come into contact with potable water or water to be used for potable supply shall comply with the UK regulations on the use of materials for potable water supply. Water Supply (Water Quality) Regulations 1989 and 15th Statement of the Department of Environment Committee on Chemical and Materials of Construction for use in public water supplies and swimming pools, published by the Department of the Environment, UK or national standards adopted for use in Kenya.

401.3 Approval

As soon as possible after commencement of the Contract, the Contractor shall submit to the Project Manager for his approval a list of his proposed suppliers, sources of materials and proposed standards. No materials, plant or equipment shall be procured for the Contract without first obtaining the Project Manager's approval. Samples of materials shall be submitted to the Project Manager for approval as required by the Project Manager. Materials subsequently supplied shall conform to the quality of the samples which have been approved by the Project Manager. No standards, method of manufacture or specification shall be changed without the approval of the Project Manager. Where possible, plant shall be supplied to the same standards or to compatible standards.

The Contractor shall provide secure storage for all samples submitted to the Project Manager.

401.4 Dimensions

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

401.5 Packaging and Protections

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

401.6 Marking

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

401.7 Receipt, Storage, Handling and Transportation

Plant, equipment and materials shall be stored in such a manner as to preserve its quality and condition to the standards required by the Contract. The Project Manager shall refuse to accept or shall reject any materials of Plant that in his opinion is defective or otherwise fails to comply with the standards required by the Contract. All such defective items shall be removed from the Site as directed by the Project Manager. Repairs shall be carried out in accordance with procedures approved by the Project Manager and shall be completed to the Project Manager's satisfaction.

401.8 Manufacturer's Certificates

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

401.9 Proprietary Materials

Proprietary materials shall be supplied in suitable containers and in appropriate batch sizes for the work to be undertaken. The containers shall be marked with the following information:

- i. Storage instructions
- ii. The manufacturer's name
- iii. Shelf life and dates of manufacture
- iv. Material identification
- v. Batch reference number
- vi. Net weight
- vii. Mixing instructions
- viii. Any warnings or precautions concerning the contents and their safe use.

The Contractor shall supply with each consignment of proprietary material delivered to the Site, certificates furnished by the manufacturer or his agent stating:

- i. The manufacturer's name and address
- ii. The agent's name and address where applicable
- iii. Material identification
- iv. Batch reference numbers, size of each batch and the number of containers in the consignment
- v. Date of manufacture.

401.10 Rejected Materials

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

402 Samples and Storage of Materials

Where required by the Project Manager the Contractor shall submit to the Project Manager for approval samples of pipes, fittings and materials prior to procurement. The Contractor shall only store pipe, fittings and other material at places approved by the Project Manager and shall at all times provide adequate supervision and watchmen to prevent theft or damage. Any loss or damage incurred will be the Contractor's responsibility.

Pipes shall not be stacked higher than recommended by the manufacturer. The area on which the pipes are to be stacked shall be free draining, the grass or other vegetation shall be kept cut and suitable timber cradles shall be provided on which the pipes shall be laid. End stops to all stacks shall be provided.

Fittings and valves shall not be stacked more than one tier high and they shall be supported off the ground by suitable timbers.

Air valves, rubber joint rings, gaskets, bolts and similar fittings and materials shall be kept in approved locked premises and such fittings and materials shall not be distributed to the trench side until immediately prior to laying, fitting, jointing or assemble thereof. All rubber joint rings and gaskets must be stored in a cool damp location and all fittings and materials shall at all times be stored in the shade under cover and protected from the weather to the satisfaction of the Project Manager.

403 Flanges

Flanges shall be faced and drilled to conform to the dimensions specified in BS 4504. Flanges shall be compatible with the pressure rating of the adjacent pipework or as stated on the drawings. Bolts, nuts and washers (two washers per bolt) shall be to BS EN 1092-3; 2003. No bolt shall project less than two full threads beyond its nut after tightening. In no circumstances shall the shortening of excessively long bolts by cutting be allowed.

Gaskets shall comply with replaced by BS EN 1514 (1997) and replaced by BS EN 681-2 (200) and BS 681-1 (1996) Type W. Flanges shall be painted with two coats of epoxy resin paint. Puddle flanges shall be fitted to all pipework passing through water-retaining structures and manholes greater than 2.5m deep.

404 Mechanical Couplings

Unless otherwise specified or shown in the Drawings pipes and fittings shall be supplied with flexible joints. Mechanical couplings shall be of the Dresser, Viking Johnson type without a centre register. Joints rings used shall be of the ethylene propylene rubber (EPDM) or other material approved by the Project Manager. All mechanical couplings and flange adapters including nuts, bolts and washers shall be supplied with 'Rilsan' nylon thermoplastic polyamide applied by fluidized bed dipping or similar approved.

405 Materials for the Assembly of Flexible Joints

Lubricant shall be of a kind not conducive to the growth of bacteria and shall have no deleterious effects on either the joint rings or pipes. Lubricants for water supply shall not impart to water, taste, colour, or any effect known to be injurious to health.

406 Ductile Iron Pipes

406.1 General

Ductile iron pipes and fittings for water supply shall comply with BS EN 545 (1995). Pipes and fittings shall have spigot and socket joints unless otherwise specified. Pipes shall be class K9. Spigot and socket flexible joints shall be of the push-fit type with gaskets of ethylene propylene rubber (EPDM). The Contractor shall supply 5% of the straight pipes suitable for cutting on site and these shall be clearly marked.

406.2 Corrosion Protection

Pipes and fittings shall be protected externally with an extruded polyethylene or polyurethane coating complying with DIN 30674 Part 1. Pipes and fittings shall be lined internally with centrifugally applied cement mortar and complying with DIN 30674. Joint areas shall be coated with epoxy or polyurethane to DIN 30674. All lining and coating materials shall be approved for contact with potable water by an internationally recognized body like the Drinking Water Inspectorate of UK.

407 Galvanised Steel Pipes

Galvanised steel pipes shall be medium duty manufactured to BS 1387.

408 Steel Pipes

408.1 General

Steel pipes shall be manufactured to BS EN 10224 or AWWA C200 and shall be suitable for the pressure ratings required by the Contract. Fittings shall conform dimensionally to BS EN 10224, AWWA 208-59 or AWWA M11. Unless otherwise specified or necessary to meet the requirements of the Contract steel pipes shall be manufactured as follows:

- a) DN300mm and below shall be manufactured to minimum of Grade L235 or API 5L Grade B
 - b) DN350mm and above shall be manufactured to a minimum of Grade L275 or API 5L Grade X42.
- The pipes and fittings of diameter 600mm or less shall be supplied with push-fit spigot and socket type joints with integral gasket of EPDM rubber or similar to BS EN 10224 or BS CP 2010. Pipes greater than 600mm shall be supplied with ends cut square suitable for use with flexible couplings and the external weld ground back sufficiently.

The Contractor shall supply 5% of the straight pipes as half length pipes (not exceeding 6m). Each pipe shall be supplied complete with a coupling for jointing.

408.2 Corrosion Protection

Steel pipes and fittings shall be protected externally at the manufacturer's works with fusion bonded epoxy resin in accordance with AWWA C213. Pipes greater than 600mm and all fittings shall also be lined internally with fusion bonded epoxy to AWWA C213. Pipes 600mm or less shall be lined with cement mortar to AWWA C205 or BS EN 10298. All lining and coating materials shall be approved for

contact with potable water by an internationally recognized body like the Drinking Water Inspectorate of UK.

Where required by the Bills of Quantities, the Supplier shall also price for the provision of an alternative 3LPE coating to DIN 30670 or AWWA C215 of a triple wrap system of fusion bonded or sprayed epoxy primer, an intermediate polymer adhesive layer and an extruded high density polyethylene coating in general conformance with ISO/DIS 21809-1 Class B as appropriate.

409 Glass Reinforced Plastic (GRP) Pipes and Fittings

Glass reinforced plastic (GRP) pipes and fittings for pressure water supply shall be high stiffness and shall comply with the relevant provision of BS 5480. The minimum pipe stiffness shall be 5,000 N/m².

Pipes and fittings shall be marked in accordance with Clause II g. BS 5480.

Pipes shall only be cut by techniques which can be shown not to impair the pipes pressure regression performance. Where any pipe is cut the exposed fibres at the cut pipe end shall be resealed to prevent potential long term degradation. Methods of cutting and resealing exposed fibres shall be submitted to the Project Manager for Approval. Elastomeric sealing rings and foils shall comply with BS EN 681.

On delivery to site and immediately prior to installation each pipe shall be visually inspected both externally, and where possible, internally for damage such as star cracking of the gel coat layer. Where any damage extends through the pipe wall the pipe shall be rejected or the damaged section cut out and replaced in accordance with repair methods approved by the Project Manager. If in the Project Manager's opinion the pipe is not suitable of repair it shall be rejected and removed from site.

410 uPVC Sewers and Pressure Pipes and Fittings

Unplasticised PVC pipes and fittings for water supply pressure pipes shall comply with British Standards 3505 current but also superseded by BS EN 1452 and 4346. They shall be obtained from an approved manufacturer and shall be minimum pressure rated (12 bars) unless otherwise stated.

Unplasticised PVC pipes and fittings for gravity sewers and drains shall comply with British Standards 4660 or 5481 and shall be obtained from an approved manufacturer. Restrained rubber ring type push fit flexible joints shall be used unless otherwise stated. Solvent weld joints will not normally be permitted. Pipes and fittings shall be protected from the direct rays of the sun at all times by means of reflective cover sheets.

411 Concrete Pipes, Bends and Junctions

Concrete pipes, bends and junctions for use in sewers shall be made with sulphate-resisting cement. Pipes, bends and junctions shall conform to the requirements of BS 5911 for the particular class of pipe required to be used. The internal dimensions shall be true and regular and the internal surface smooth and free from surface blemish. The actual diameter of the pipe shall be not less than the nominal diameter. All joints shall be of the gasket type with flexible spigot and socket approved by the Project Manager. Gaskets shall be elastomeric complying with BS EN 681.

The main pipe and branches of all junctions shall be of the same strength classification and shall have the same internal dimensions as the pipes with which they are to be used.

The pipes, bends and junctions delivered to the Site shall be certified by the pipe manufacturer to have complied with BS 5911, or other approved standard and one copy of the certificate shall be delivered to the Project Manager before the goods are unloaded.

Unless otherwise specified pipes are required to be of Extra Strength; they may, unless otherwise specifically called for, be reinforced either with cast-in steel or by an external wrapping of fibre glass and resin, applied by an approved manufacturer.

The Contractor shall provide all facilities for and shall carry out jointly with the Project Manager (if so required) a full visual inspection of all pipes, bends and junctions for manufacturer's defects and other faults or damage. Before any pipe, bend or junction is laid it shall again be carefully examined and sounded with a wooden mallet. Any pipe found to be cracked or otherwise defective shall not be used on the Works.

Concrete pipes shall be internally coated with a 100 percent solids coal tar epoxy lining 70 percent minimum epoxy content. Coat thickness 300 micron minimum.

412 HDPE Pipes and Fittings

412.1 General

Polyethylene pipes up to nominal size 63mm for below ground use shall be coloured blue and comply with the relevant provisions of BS 6572. Polyethylene pipes for use in nominal diameters greater than 63mm shall be as specified below.

The pipes shall be clearly and indelibly marked to show the name of the manufacturer, diameter, pressure class and date of manufacture.

House connection pipework downstream of the manifold shall be PE80; all other HDPE pipework shall be PE100.

412.2 Compound Material

The material from which the pipes are made shall be in accordance with ISO 4427-1. All pipes shall be manufactured using pre-compounded carbon black, bimodal, high density polyethylene MRS 10.0 material (PE100). The use of natural PE100 with a Carbon black master batch is strictly not allowed.

Carbon black should be well dispersed to give outstanding UV resistance, and should have a minimum carbon content of 2%. Pipes should be manufactured from certified PE100+ material with batch certification available with pipe delivery.

412.3 Identification compound

The compound used for identification stripes shall be manufactured from a PE polymer manufactured from the same type of base polymer as used in the compound for pipe production.

412.4 General appearance

When viewed without magnification, the internal and external surfaces of pipes shall be smooth, clean and free from scoring, cavities and other surface defects such as would prevent conformity of the pipe to ISO 4427. The pipe ends shall be cut cleanly and square to the axis of the pipe.

412.5 Color

The pipes shall be black with coloured identification stripes.

412.6 Dimensions

The dimensions of the pipe shall be measured in accordance with ISO 3126. Manufacturing shall be to ISO 4427 Standard, as per the approved dimensions chart.

Pipes should be manufactured in machinery capable of ultrasonic wall thickness detection with production reports provided with delivery of pipes. Where coiling is possible, the minimum internal diameter of the coil shall not be less than 18d.

The lengths shall be supplied to minimize the number of joints to be done in the field, and the size that is allowed to be legally transported on Kenyan roads by the traffic department.

412.7 Markings

All pipes shall be permanently and legibly marked in such a way that the marking does not initiate cracks or other types of failure and such that normal storage, weathering, handling, installation and use does not affect the legibility of the marking.

The colour of the printed information shall differ from the basic colour of the product. The marking shall be such that it is legible without magnification. The frequency of marking shall not be less than once per metre. Markings should be made using a hot embossed foil stamp printing.

Each pipe shall have a minimum of 3 equispaced blue longitudinal stripes indicating medium of fluid transported in the pipes. A summary of marking requirements are given in the table below.

(xiii) Minimum required marking

<u>Aspect</u>	<u>Marking</u>
Standard Number	ISO 4427
Manufacturer's identification	Name or symbol
Dimensions ($d_n \times e_n$)	e.g. 125X11.4
SDR series (for DN > 32)	e.g. SDR 11
Material and designation	PE 100
Pressure rating in bar	e.g. PN 16
Production period (date or code)	e.g. 0204 ^a
Country of Production	Kenya

Aspect	Marking
Coils shall be sequentially marked with the metreage, indicating the length remaining on the coil.	
^a - In clear figures or in code providing traceability to the production period within year month and, if the manufacturer is producing at different sites, the production site.	

412.8 Jointing of Pipes

Unless otherwise specified or approved by the Project Manager, Polyethylene pipes shall be electro fusion welded. Joints between polyethylene pipes supplied from different manufactures or not manufactured from the same grade of polymer shall only be jointed by electro fusion or by push fit mechanical couplings. Mechanical couplers and compression type fittings shall incorporate a serrated internal liner to support the pipe against compression loads exerted by the fitting and to prevent pullout under axial load.

Butt or socket fusion joint techniques shall only be applied between pipes supplied from single source and manufactured from the same grade of base polymer. Fusion welding of polyethylene pipes shall only be undertaken by skilled operatives using appropriate specialized tooling. Pipes to be jointed shall be free from contamination and care shall be used to protect fusion jointing operations from wind and against the effects of inclement weather. Mechanical jigs or other approved methods shall be used to ensure correct alignment of the pipe when making butt fusion joints. Details of fusion welding procedures including details of tools, operatives, materials and method statements shall be submitted to the Project Manager for approval prior to any jointing.

Steel and iron pipe fittings shall comply with the relevant provision of BS EN 545 (1995) replaced by BS EN 10224 but also current.

412.1 General

Polyethylene pipes up to nominal size 63mm for below ground use shall be coloured blue and comply with the relevant provisions of BS 6572. Polyethylene pipes for use in nominal diameters greater than 63mm shall be coloured blue High Density Polyethylene (HDPE) suitable for a working pressure of 12 bars.

The pipes shall be clearly and indelibly marked to show the name of the manufacturer, diameter, pressure class and date of manufacture.

House connection pipework downstream of the manifold shall be PE80; all other HDPE pipework shall be PE100.

412.2 Joints

Unless otherwise specified or approved by the Project Manager Polyethylene pipes shall be electro fusion welded. Joints between polyethylene pipes supplied from different manufactures or not manufactured from the same grade of polymer shall only be jointed by electro fusion or by push fit mechanical couplings. Mechanical couplers and compression type fittings shall incorporate a serrated internal liner to support the pipe against compression loads exerted by the fitting and to prevent pullout under axial load.

Butt or socket fusion joint techniques shall only be applied between pipes supplied from single source and manufactured from the same grade of base polymer. Fusion welding of polyethylene pipes shall only be undertaken by skilled operatives using appropriate specialized tooling. Pipes to be jointed shall be free from contamination and care shall be used to protect fusion jointing operations from wind and against the

effects of inclement weather. Mechanical jigs or other approved methods shall be used to ensure correct alignment of the pipe when making butt fusion joints. Details of fusion welding procedures including details of tools, operatives, materials and method statements shall be submitted to the Project Manager for approval prior to any jointing.

Steel and iron pipe fittings shall comply with the relevant provision of BS EN 545 (1995) replaced by BS EN 10224 but also current.

413 Gate Valves

413.1 General

Valves for normal duty on water pipelines with pressure ratings up to PN25 shall be key operated cast iron flanged gate valves for waterworks purposes generally complying with the requirements of BS 5163 (Type B). All Gate Valves shall be supplied with a 10 year manufacturer's warranty.

Cast iron gate valves for pressure ratings to PN14 shall be cast iron flanged valves complying with BS 5150 replaced by BS EN 1171 (both BS 5150 and BS 5151) or cast iron parallel slide valves complying with BS 5151.

Butterfly valves for pressure ratings of up to PN14 shall be double flanged wafer type butterfly valves complying with BS 5155.

Unless otherwise specified valves for use on steel pipes shall be flanged, where butt-weld ends are specified valves shall comply with BS EN 1984, or BS EN 13709.

413.2 Wedge Gate Valves for Manual Operation

Valves up to and including DN 300 shall be of the resilient seal type and valves larger than DN 300 shall have metal seals.

Spindles shall be of the non-rising type and screwed so as to close the valves when rotated in the clockwise direction. The direction of closing shall be clearly cast on the valve cap or hand wheel as appropriate. The valves shall be constructed of the following materials:

body	-	cast iron;
spindle	-	forged bronze or stainless steel;
metal faces and seal	-	Gunmetal.

The valves shall be suitable for the unbalanced head as specified or indicated in the schedules.

Suitable gearing and anti-friction devices such as ball bearing thrust collars shall be provided as necessary to enable opening and closing by manual operation at the pressure stated, using an effort no greater than 26kg on the tee key or hand wheel supplied. Hand wheels shall not exceed 500mm diameter. A bypass with gate valve forming an integral part of the valve shall be provided where recommended by the valve manufacturer for the pressures specified.

Gearing on valves of DN 300 and less shall be enclosed in a sealed gearbox suitable for buried installation and operated with a tee key. Except where shown in the Drawings, all valves exceeding DN 300 shall be provided with bevel gearing and hand wheels. Valves to be used for washouts and isolating air valves shall have screwed seats.

Extension spindles shall be galvanized or stainless steel adequately supported with cast iron brackets, and of sufficient diameter to prevent any whiplash effect through twisting when being used to operate the valves. The spindles shall be capped for key operation. Valve caps shall be fitted with hexagonal set screws.

Valves shall be coated with an approved epoxy complying with DIN 30674. Keys for valve operation shall be of sufficient length so that the valves can be operated by a man standing, but shall not exceed 1.2m in length, and shall have a detachable cross bar.

414 Butterfly Valves

414.1 General

Butterfly valves shall conform to BS EN 593. All Butterfly Valves shall be supplied with a 10 year manufacturer's warranty.

414.2 Construction

Butterfly valves shall have a high grade cast iron body to BS EN 1561 designed to the specified working and test pressures. The pressure rating valve shall be cast in the valve body. The disc shall be of high grade cast iron to BS EN 1561 or nodular cast iron to BS 2789 to the defined working and test pressures. It shall have a convex shape designed to achieve low head loss characteristics. The valve shafts shall be of stainless steel operating in self-lubricating bushes in the body.

The valve seat shall be of gunmetal to BS 1400. The sealing ring shall be a renewable Ethylene Propylene Diene Monomer (EPDM) rubber attached to the disc edge by a sectional bronze retaining ring to form a resilient and durable seal.

The valves shall be fitted with hand wheel actuators not exceeding 500mm diameter incorporating gearing to allow opening and closing by manual operation at the pressure stated using an effort no greater than 36kg on the hand wheel supplied.

In all cases the gearing shall be designed to close the valve, from fully open to fully close in a period of not less than ten minutes with this effort. Actuators shall be designed so as to close the valves when the hand wheel is turned in a clockwise direction; the direction of closing shall be clearly cast on the hand wheel. Position indicators shall be fitted to all actuators.

Where required valves shall be electrically actuated with a manual override. Remote actuation shall be provided with a visual indication of valve open, valve closed and percentage opening together with fault indication.

414.3 Valve Performance

A performance curve, relating percentage valve travel, open area and discharge coefficient shall be submitted to the Project Manager. The head loss coefficient with valve fully open shall be defined.

414.4 Testing

All valves shall be tested in accordance with BS EN 593 and pressure and material test certificates shall be submitted to the Project Manager for approval.

415 Air Valves

Air valves shall be either:

- a. Single (small) orifice valves (SAV), for the discharge of air during the normal operation of the pipeline.
- b. Double orifice valves (DAV), consisting of a large orifice and a small orifice. These shall permit the bulk discharge of air from the main during filling and air inflow when emptying in addition to

the discharge of small quantities of air during normal operating conditions.

Air valves shall be supplied with an independent isolating butterfly valve (DAV) or cock (SAV) which permits the complete removal of the air valve from the main, without affecting the flow of water in the main.

Each air valve assembly shall be suitable for connection to a flange on the pipeline.

At the connection between the air valve and its isolating valve a BSP tapping shall be made suitable for fitting of a pressure gauge. All tapings shall be sealed by a brass plug and copper compression ring gasket.

Air valves shall operate automatically and be constructed so that the operating mechanism will not jam in either the open or closed positions.

416 Non-Return Valves

416.1 Swing Check Valves

Non-return valves shall be suitable for waterworks purposes and shall be manufactured to comply with the general requirements of BS EN 12334. They shall be double flanged type, non-slamming and recoilless on flow reversal.

Valves of DN 700 and larger shall be of the multi-disc type or tilting disc type. The valves shall have a high grade cast iron body and cover to BS EN 1561 Grade 220/260 with gun metal nickel bronze alloy door seating. The hinge pin shall be of stainless steel carried on non-corrodible bearings.

416.2 Nozzle Check Valves

Nozzle check valves shall be slam free closing with a streamlined cross section as manufactured by Mannesmann Demag or similar.

417 Flow Control Valves

Flow controls unless otherwise specified shall be butterfly valves. They shall be installed complete with a headstock and position indicator showing the degree of opening.

418 Pressure Reducing Valves

Pressure reducing valves shall automatically reduce a higher inlet pressure to a steady lower downstream pressure regardless of changing flow rate or varying inlet pressure. The valve shall be a hydraulically operated pilot controlled diaphragm type, globe or angle valve.

The main valve shall have a single removable seat and a resilient disc.

419 Ball Float Valves

Ball float valves which are to be installed within reservoirs shall be the delayed action type to eliminate inflow at small valve openings. They shall be fitted with a stilling chamber, auxiliary float valve and inlet bellmouth with regulating valve. The main valve shall be fitted with a long actuating lever to provide a long float travel for slow valve closure.

Valves shall be of the right angle pattern type with flanged inlet and have a resilient synthetic rubber disc which forms a drop tight seal against a removable seat insert. Valves shall be free of cavitation and vibration under the specified working conditions. Flanged tapers shall be provided on the inlets as necessary to suit the size of valves proposed.

Valves shall be capable of withstanding the maximum static pressure and of passing the maximum flow rate shown. Orifice plates shall be provided as necessary to absorb excess working pressure at the initial flow rates indicated.

The pressure rating of the valve shall be cast into the body of the valve.

420 Constant Flow Valves

Constant flow valves shall maintain a constant rate of flow regardless of fluctuations in upstream pressure.

Valves shall be hydraulically operated, diaphragm actuated globe pattern. They shall have a resilient synthetic rubber disc which forms a drop tight seal against a removable seat insert. The diaphragm assembly and valve stem shall be fully guided at both ends by bearings in the valve cover and valve seat. The diaphragm shall consist of nylon fabric bonded with synthetic rubber. Packing glands and stuffing boxes are not permitted and there shall be no pistons operating the valve or pilot controls.

The pilot control shall be direct acting diaphragm valve designed to close when the actuating differential increases beyond the spring setting. The actuating differential pressure shall be produced by a thin edged orifice plate installed in an orifices flange downstream of the valve.

Any necessary repairs to the valve shall be accomplished without removing the valve from the main.

Valves shall be sized to pass the maximum continuous flow stated on the drawings at the working pressure given. The pressure rating of the valve shall be cast into the body of the valve.

421 Surface Boxes and Chamber Covers

Surface boxes and chamber covers shall be either cast iron or ductile iron and coated with black bituminous solution.

Surface boxes over gate valves shall be hinged and chained and shall generally comply with BS 5834.

In roads, tracks, verges: Heavy duty with 150 x 150mm nominal clear opening.

In fields and areas subjected to light wheeled or pedestrian traffic: Medium duty with 150 x 150 mm nominal clear opening.

Surface boxes for hydrant chambers shall have a 150 x 150mm clear opening and shall comply with BS 750 and shall be suitable for heavy traffic loading.

Covers to air valve and other chambers shall be to the dimensions and loading requirements shown on the Drawings or as stated in the Bill of Quantities.

Covers shall be suitable for the following maximum safe centre static loads:

Light duty	- 250kg
Medium duty	- 1500kg
Heavy duty	- 5000kg

Where applicable, covers shall comply with BS EN 124 or other appropriate Standard.

Lifting keys shall be provided for each type surface box or cover supplies. One set of keys shall be provided for every ten surface boxes or covers subject to a minimum of ten sets of keys or the actual number of covers if less than ten.

422 Gully Gratings and Frames

Road gully gratings and frames shall be of approved type and manufacture in cast Grey Ductile Iron and shall be of Heavy Duty Non-rocking Pattern designed for wheel load of 11.5 tonne and generally in accordance with BS EN 124. Single gullies of nominal size 1050mm x 750mm. Inlet gratings of other plan dimensions shall have a minimum water way area of 49% of the total inlet grating area.

Gully frames shall be set in cement mortar and haunched with Class C25 concrete. It shall be the Contractor's responsibility to establish the finished road levels from the appropriate authority and fix the gratings accordingly.

423 Manhole Safety Chains

Mild steel chain shall be 8 mm nominal size Grade M (4) non-calibrated chain, Type 1, complying with BS withdrawn. After manufacture, mild steel safety chains shall be hot dip galvanized in accordance with BS EN 124.

424 Manhole and Chamber Access Covers

The manhole and chamber access covers shall comply with BS 497 Part 1 and be obtained from an approved manufacturer and shall be to the internal minimum clear opening as detailed in the Contract.

All manhole and chamber access covers in road shall be to an approved Heavy Duty pattern and in footpaths shall be medium/heavy duty unless otherwise specified. The frame and lid shall have key holes formed with sealed pockets underneath to prevent ingress of sand, grit and surface water and shall be of an approved non-rocking pattern. The covers and frames shall have accurate seating faces to prevent rocking and the ingress of sand or water, and it shall be tight fitting to resist overflow conditions or

unauthorized removal. The seating faces shall be coated with graphite grease before installation of the cover.

A supply of keys for use with every type of manhole cover and surface box shall be handed over by the Contractor at the completion of the Contract on the basis of one set of keys for each 50 covers or part thereof.

Manhole and chamber cover frames shall be set in cement mortar and haunched with Class C30/10 concrete and shall be set to the camber or fall of the finished road surface. It shall be the Contractor's responsibility to establish the finished road surface levels from the appropriate authority and to fix the covers accordingly.

425 Manhole Step Irons

Manhole step irons shall be of galvanized malleable iron and shall conform in all particulars to BS EN 13101.

SECTION 4B. PIPELINE CONSTRUCTION

426 General

The requirement of this section shall apply to the construction of potable and raw water pipelines and pipework.

Within this section ‘Plant’ refers to pipe fittings, valves, surface boxes and chamber covers, and other such materials required for pipelines, mains and pipework at reservoirs and elevated tanks.

All Plant shall be suitable for waterworks purposes for the conveyance of potable water in the climatic conditions prevailing in Kenya and in particular at the location of the Works.

The Project Manager shall provide details of each pipeline diameter, pressure rating, hydraulic characteristics and the approximate alignment. The Contractor shall, in consultation with the Project Manager set out the proposed pipeline alignments, making any changes that the Project Manager may deem necessary, confirming also the exact locations of all manholes, valves, air valves, washouts, hydrants, and the like.

427 Topographic Surveys

Topographic surveys along pipeline routes shall be either:-

- Plan and profile surveys, or
- Line and level traverse

surveys, as instructed by the

Project Manager.

Plan and profile surveys shall cover a strip of 10.0m wide centrally on the proposed centre line of the pipeline. The survey shall be carried out in accordance with the specification detailed in Clause 106.

Line and level surveys shall comprise a traverse line along the centre line of the pipeline as established by the Project Manager.

428 Handling and Transport of Pipes and Fittings

The loading, transporting, unloading and handling of pipes and fittings shall be carried out such that no damage is caused. All in accordance with the recommendations of the manufacturer and to the approval of the Project Manager. The use of lifting hooks is not permitted. Pillows shall be provided between lashing (ropes, wires or chains) and the pipes. All cradles and lashings shall be of such widths as to prevent damage to the coating of the pipe, or distortion of the pipes.

Valves and fittings shall be transported in timber packing and where possible in the manufacturer’s original packaging.

Protective cover and other protective materials provided by the manufacturer shall not be permanently removed until immediately prior to installation.

In the event of any damage being caused to a pipe, the Project Manager shall determine whether damaged piece shall be replaced or repaired. Repair to coating only shall be allowed and shall be as directed by the Project Manager.

In all instances when along trench sides, ferrous pipes shall be supported within 1 metre of either end on sand filled bags such that no part of the wall of the pipe touches the ground, and in the case of pipes over 6 metres long with additional central sand bags.

When pipes are being loaded into vehicles care shall be taken to avoid their coming into contact with any sharp corners such as cope irons, loose nail heads, etc. Whilst in transit, pipes shall be well secured over their entire length and not allowed to project unsecured over the tailboard of the lorry.

Pipes may not be offloaded from lorries by rolling them, suitable carnage shall be used. Pipes shall not be rolled or dragged along the ground.

429 Stringing and Examination of Pipes Prior to Laying

All DI and Steel Pipes and their coatings and linings shall be carefully inspected on Site prior to laying.

Inspection of the pipe will be made by the Project Manager after delivery and again immediately prior to laying. Any pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the site.

All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Project Manager. Handling and laying of pipe and fittings shall be in accordance with the Manufacturer's written instructions and as specified herein.

Before lowering into the trench or placing in position each ductile iron pipe or casting shall be slung and sounded with a mallet to test for hair cracks. Pipes that do not ring true will be discarded.

All cement mortar linings shall be visually inspected for defects such as cracking or spalling and crack widths shall be measured to confirm that width is such that natural re-sealing will occur once put into service; otherwise cracks as well as any spalling shall be made good before laying in accordance with the manufacturer's written instructions.

All epoxy linings and all coatings shall be subjected to holiday detection tests, in accordance with NACE RP 0490, the voltage of the holiday detector being selected appropriate for the material and its thickness. No pipe shall be laid having failed the holiday tests until the defective area is made good in accordance with the manufacturer's written instructions and retested satisfactorily before use.

All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until they are used in the work, and when laid, shall conform to the lines and grades required. Pipe shall not be laid unless the trench is free of water and in a satisfactory condition. Ductile iron pipe and fittings shall be installed in accordance with the requirements of AWWA C600 except as otherwise provided herein. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner by the Contractor, at his own expense.

When laying is not in progress, including any work break exceeding 30 minutes, the open ends of the pipe shall be closed by watertight plugs or other approved means. Good alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by the Manufacturer. End caps shall not be removed until such time as the pipe is to be inspected and laid.

Where the pipeline crosses roads, tracks or any other access or where directed by the Project Manager, the Contractor shall place the pipes so that access to the public is not in any way prohibited.

Shortly before laying or fixing any valve, pipe or fitting, the Contractor shall examine each valve, pipe and fitting to ascertain that there is no damage or defect. The Contractor shall give the Project Manager not less than 48 hours notice of his intention to undertake such examination. The Contractor shall not lay such pipes and fittings until he has received approval from the Project Manager.

Linings shall be inspected prior to laying and any defect made good.

430 Laying Pipes

Immediately before any pipe is lowered into the trench the plug shall be removed from the end of the last pipe laid and the new pipe shall be carefully lowered into the trench.

Each pipe and fitting shall be laid true to alignment curve and gradient in accordance with the Drawings or as directed by the Project Manager. The minimum gradient shall not be flatter than 1 in 500.

Pipes shall be boned to gradient and sight rails shall be provided for this purpose at intervals not exceeding 50m and at all changes in grade. No dips or summits shall be permitted other than as shown on the Drawings.

430.1 Embedment and Compaction

All ductile iron and steel pipes shall be embedded using a sand or coarse grained soil with less than 12% fines, which if necessary shall be imported if excavated material is found to be unsuitable:

In areas prone to water logging or where specifically called for on the Drawings or in the Bills of Quantities a single size or graded gravel shall be used as a special lower bedding, with grading as indicated below.

Nominal Pipe Diameter (mm)	Grading for Special Lower Bedding [to ASTM Sieve Sizes]	
	Single size Gravel	Graded gravels
< 200	10 or 14 single-size gravel	14 to 5 graded
200 to 500	10, 14 or 20 single-size gravel	14 to 5 graded or 20 to 5 graded
> 500	10, 14, 20 single-size crushed rock or gravel	14 to 5 graded or 20 to 5 graded

The suitability of as-dug trench material as an embedment material and where imported, the source shall be approved by the Project Manager. Any delays as a result of not seeking this approval in good time shall be entirely to the Contractor's account

All layers of the embedment shall be thoroughly compacted, and shall not exceed 150 mm and be raised evenly on both sides of the pipe as it is placed. A minimum compaction of 90% MPD shall be achieved at all times, this being confirmed by sampling and testing at intervals on different levels of embedment at intervals of not more than 50 m with testing in accordance with BS 1377 or ISO 22476 using the “sand replacement” method.

Should any results fail to achieve this absolute minimum level, then the pipes, embedment material and layer shall be removed for an equal distance on either side of the failed test, the total distance being equal to the length between adjacent sampling locations, and re-laid appropriately but with compacted layer thickness halved. In addition the distance between sampling and testing shall also be halved until in the opinion of the Project Manager’s Representative a sufficient number of consecutive passes allows both individual layer thickness and the distance between sampling and testing to be returned to the previous thickness and spacing.

All backfill soil above the embedment shall be free from clay lumps, boulders and rock fragments greater than 50 mm and as far as practicable, given the nature of the soil, 90 % MPD shall be attained. However, this requirement may be relaxed to 85% MPD by the Project Manager’s Representative if he considers the circumstance warrant it.

430.2 Pipes Laid in Trench

Pipes and fittings laid in trench shall have at least the minimum cover stated in the Drawings. Long radius curves in buried pipelines shall be negotiated by deflections taken up in the joints of one or more pipes. The deflection at joints shall not exceed 75% of the manufacturer’s maximum specified limits. Designs have been based upon the use of 6m long pipes. If the Contractor provides longer pipes sufficient short lengths shall be provided to enable the proposed pipe curvature without additional bends or deep excavation.

Pipes shall not be dragged along the trench bottom. Pipes laid in trenches shall be laid and firmly bedded on an even and uniform bed. Where pipes are not laid on a granular bed, the bottom of the trench shall be smooth and free from stones or other projections.

Joint holes shall be excavated below the trench bottom and shall be as small as possible and shall be filled in and compacted after the pipes are laid and before the refilling of the trench is commenced.

430.3 Pipe Bedding and Surround

For polyethylene, uPVC and GRP pipelines, Class S bedding shall be used where the cover is equal to or greater than 1.0m. Where there is less than 0.6m cover, Class A concrete surround shall be used. In between the Project Manager shall decide upon the bedding type dependent upon the assessed risk of damage to the pipe.

430.4 Pipes Laid Above Ground

Pipelines to be laid above ground shall be constructed of flanged ductile iron pipes with mechanical type expansion joints. Supports shall be provided at a maximum spacing of one pipe length and adjacent to the flanged joints.

The expansion joints shall compensate for a variation of ambient temperature between zero and 40° C on the adjoining pipeline. Anchorages shall be provided immediately uphill of each expansion joint and at each change in vertical and horizontal alignment. The ground/rock surface under the pipeline shall be re-graded as necessary to allow a satisfactory vertical alignment of the pipeline.

The Contractor may propose, as an alternative to the use of mechanical expansion joints, either of the following methods for accommodating thermal expansion:

- (1) A zigzag pipeline alignment whereby the thermal movement is accommodated by deflection of the bends.
- (2) A rigid form of construction with the thermal movement being constrained within the pipe walls by the use of substantial anchor blocks.

Joints shall be made in compliance with the manufacturer's instructions as approved by the Project Manager. Care shall be taken to ensure the absolute cleanliness of the pipe ends and joint components. Only the recommended approved lubricants shall be used.

Jointing shall only be carried out by experienced personnel under close supervision by the Contractor.

The Contractor shall ensure that no dirty water or other extraneous matter is allowed to enter the pipes during or after laying. In the event of dirty water or extraneous matter entering the pipes the Contractor shall immediately carry out cleaning and disinfection as directed by the Project Manager.

Except when necessary for jointing, the end of the last pipe laid shall be kept plugged to the satisfaction of the Project Manager to prevent the ingress of dust, dirt, rocks and other debris.

The Contractor shall be liable for any damage caused to the Employer's Plant and apparatus or other equipment as a result of foreign matter of any kind not having been cleared out of pipelines before Taking-Over.

Pipe trenches shall not be backfilled until approved by the Project Manager. Once approved trenches shall be backfilled without delay to at least the minimum extent required for pressure testing.

431 Cutting Pipes

The edges of the cut pipes shall be clean, true and square. Ductile iron pipes shall only be cut with an approved mechanical pipe cutter in conformity with the pipe manufacturer's recommendations. The use of oxyacetylene flame cutter will not be permitted. The edges of the cut together with those parts of the pipes from which the coating has been removed shall be given two coats of bituminous paint and the internal lining repaired. When the cut pipe is to be inserted in a "Tyton" type joint it shall be bevelled for 10mm at 30° to pipe the axis.

Asbestos Cement, HDPE, uPVC and GRP pipes shall be cut with an approved mechanical pipe cutter and in conformity with the pipe manufacturer's recommendations. Where the cut end of the pipe is to be incorporated in a joint the pipe shall be turned down to the correct diameter required for forming the joint by an approved mechanical turning machine. The length of turning shall be accurately bevelled by mechanical means to the dimensions specified in the manufacturer's recommendations.

Steel pipes shall be cut by using a mechanical pipe cutter approved by the Project Manager. The use of an oxyacetylene flame cutter will not be permitted. The edges of the cut shall be given two coatings of liquid epoxy compatible with the original coating. The external coating and the internal lining shall be repaired to the approval of the Project Manager. The cut end shall be bevelled as required to suit the form of joint used.

432 Proprietary Joints and Couplings

Proprietary joints and couplings shall be assembled in accordance with the manufacturer's instruction as approved by the Project Manager. Where pipes are laid above ground and jointed with bolted

couplings the joint shall be protected against vandalism by sheathing with an approved heat-shrink moulding as manufactured by Raychem of Swindon UK or similar approved.

433 Flanged Joints

Flanged joints shall be made with two washers per bolt, one under the bolt head and the other under the nut. The tightening of the bolts shall be carried out in the sequence and to the torque recommended by the manufacturer. A torque wrench shall be used.

Buried flange joints shall be protected by painting with approved bitumen paint and by wrapping using 'Denso' paste, mastic tape and outer wrap, or similar approved materials all in accordance with the manufacturer's instructions as approved by the Project Manager, unless supplied with epoxy coating and galvanized bolts.

Flanged adaptors and mechanical couplings shall have a RILSAN nylon coating applied by the manufacturer.

434 Steel Pipelines Welded Joints

If specifically required under the contract pipes shall not be welded. If permitted by the Project Manager for particular conditions the Contractor shall submit to the Project Manager a detailed method statement for constructing the pipeline using welded joints which shall include, but not be limited, to:

- (i) details of the Contractor's skilled labour and supervision staff who have direct experience in the construction of welded steel pipe;
- (ii) details of the Contractor's plant to be deployed;
- (iii) details of temporary staging, access and craneage;
- (iv) procedure for construction of supports and anchorages, and welding joints;
- (v) quality assurance proposals for testing the integrity of the welds.

These details shall be submitted to the Project Manager for his approval not later than 21 days before the Contractor wishes to commence pipe laying.

All field welds shall be inspected visually with special attention given to the line up and down the root run or stringer beads. Non destructive testing of the completed weld shall be carried out using radiographic methods with procedures in accordance with BS 2910.

On completion and inspection of joint welding, remedial works shall be carried out on the internal lining and external coating. No more than five pipe joints shall be welded without completion of remedial works to joints.

435 Fixing Valves and Penstocks

Valves, penstocks and other fittings shall be securely fixed. Extension spindles and headstocks shall be properly aligned and fixed in a vertical position and valve caps shall be fixed securely using the locking nut.

436 Thrust and Anchor Blocks

Concrete thrust and anchor blocks shall be formed at bends, tees and valves in accordance with the details shown on the Drawings or as directed by the Project Manager. Excavation shall be made after pipelaying and the blocks concreted immediately after excavation. The back supports and blocks shall abut in to solid undisturbed ground with all loose material being removed before concreting.

No pressure shall be applied in any section of main until the concrete has achieved adequate strength and at least three day's curing.

Flexible joints shall not normally be cast in. Where the size of the block does not make this possible, additional flexible joints shall be provided no greater than half a pipe diameter beyond each face of the block.

437 Concrete Surround to Pipes

Where pipelines pass under streams and rivers or where directed by the Project Manager, the pipeline shall be surrounded with concrete as shown on the Drawings.

Concrete surround shall be "broken" at all pipe joints to retain flexibility in the pipeline. No joints shall be concreted in without the prior approval of the Project Manager.

438 Flotation of Pipelines

The Contractor shall ensure that flotation of the pipeline does not occur during construction. Sufficient backfill shall be placed over each pipe after laying and before testing to prevent flotation.

439 Pressure Rating

The pressure rating of pipes shall be as indicated on the drawing or Bill of Quantities or if not indicated then selected such that the maximum pressure in the pipeline inclusive of surge pressures shall not exceed the maximum allowable sustained working pressure rating of the pipe;

The surge pressure amplitude (the difference between maximum and minimum surge pressures) shall not exceed one half of the maximum allowable sustained working pressure rating of the pipe.

440 Testing of Water Supply Pipelines

All pressure pipelines shall be hydrostatically tested. Site test pressures shall be 1.5 times the maximum working pressure or allowance pressure plus 5 bar whichever is the smaller measured at the lowest part of the pipeline, unless otherwise specified on the drawings.

The Contractor shall give the Project Manager not less than 48 hours notice of his intention to carry out a pressure test. Testing shall not commence without the Project Manager's approval. Before a length of pipe is tested, each pipe shall be securely anchored. All thrust and anchor blocks shall have been constructed and, the barrel of each pipe shall be backfilled to the extent necessary to prevent flotation or movement of the pipeline and shall be not less than 600mm.

Normally joints shall be left exposed until pressure testing has been satisfactorily completed. Any need to backfill a pipeline before pressure testing shall not relieve the Contractor of his responsibility to excavate to locate and repair any leaks.

Pressure testing shall be carried out as the work proceeds in such lengths as are convenient but not exceeding 500m. The ends of the length of pipeline under test shall be closed by means of securely anchored caps or blank flanges. Pipeline valves shall not be used for this purpose. All washout valves shall be fitted with blank flanges and the valves opened before the commencement of any pressure test. At each air valve location, a special air release arrangement shall be provided to allow manual release of air during filling operations. Pressure testing shall not be carried out with permanent air valves in place.

The pipeline to be tested shall be filled slowly with water in such a manner that all air is expelled. Air vents shall be checked to ensure that no air is trapped at high points.

The pressure in the pipeline shall slowly be raised to the working pressure, the test pump disconnected and the pipeline left charged under pressure with air valves opened for a period of not less than 24 hours to allow air in the pipeline to be expelled and pipe linings and pipe walls of absorbent materials to become saturated. At the end of this period of time air valves shall be closed and the test pump shall be reconnected and the pressure in the pipeline raised to the test pressure and this pressure maintained for a period of 24 hours or such other period as directed by the Project Manager.

Throughout this period the pressure in the pipeline shall not be allowed to fall or rise more than 6m head of water above the test pressure and this shall be accomplished by pumping water into or releasing water from the pipeline as required. The volume of water pumped into or released from the pipelines shall be carefully measured. At the end of the test period the pressure in the pipeline shall be adjusted to the test pressure by pumping water into or releasing water from the pipeline as required.

The apparent leakage from the pipeline shall be ascertained from the net volume of water that has been pumped into the pipeline during the test period. The permissible loss shall not exceed 2 litres per metre nominal bore per kilometre length per m head per 24 hours.

During the pressure test exposed joints shall be inspected and any leakage or seeping joints shall be remedied. All signs of leakage shall be remedied whether total apparent leakage from the pipeline under test is less than the apparent allowable leakage or not. Should any length of pipeline fail to pass the pressure test the Contractor shall at his own expense carry out all work necessary to locate and remedy the faults and to retest the pipeline until it satisfactorily passes the test.

A low pressure air test (not exceeding 0.3 bar) may be used as a preliminary joint tightness test prior to backfilling and hydrostatic testing. The water used for pressure testing shall be provided by the contractor and shall be free from impurities and of such a quality which will not pollute or injure the pipeline. The Contractor shall be responsible for obtaining the water, transporting it and for its safe disposal on completion.

441 Cleansing and Sterilizing of Pipelines

After the pipelines have been completed and pressure tested satisfactorily as herein specified the Contractor shall flush out and cleanse the pipelines. Where water is provided by the Employer, the cost of this will be reimbursable under a provisional sum.

Diameters 300 mm and greater:

Pipelines shall be cleansed in sections and this shall be carried out by means of passing through polyurethane foam swabs. The swabs shall be to the approval of the Project Manager.

Diameters less than 300 mm:

Pipelines shall be cleansed in sections by flushing with potable water, for a period of time to be decided by the Project Manager's Representative.

Cleansing of any section shall be repeated as required by the Project Manager's Representative in the event of the initial or subsequent operation not being to his satisfaction. The cost of such water shall be charged to the Contractor.

The Contractor shall supply all necessary equipment for the cleansing and sterilizing operations, including all swabs and swab detectors which shall be handed over to the Employer on completion of the Works.

Swabs shall be passed through pipelines at speeds of between 0.2 and 0.4 metres per second to obtain the best cleaning results with the minimum number of passes. Should it be apparent from the debris collected by the swab that damage to the lining has occurred, the Contractor shall be wholly responsible for repairing the lining to the satisfaction of the Project Manager's Representative.

The swabbing operation shall be controlled by an experienced Project Manager to ensure that no undue surges in the pipeline, heavy docking of the pig or pressurising of the pipeline occur causing damage to any of the permanent works. Any damage caused shall be made good by the Contractor to the satisfaction of the Project Manager's Representative.

The Contractor shall make all necessary arrangements for the transportation of water from the point of supply from the Employer to the required location, and make all arrangements for the disposal of the water. All disposal methods and locations shall be to the approval of the Project Manager's Representative.

When the pipelines have been cleansed to the satisfaction of the Project Manager's Representative the Contractor shall introduce at a slow rate of water flow by a portable chlorinator or other approved means of a solution of sterilizing agent in such quantity and of such strengths as will result in the concentration of chlorine throughout the length of the pipelines of not less than 30 parts per million. This sterilizing charge shall be allowed to remain in the pipelines for 24 hours after which time the pipelines shall be thoroughly flushed using the supply water to remove chlorine in excess of that in the supply water.

When this flushing has been satisfactorily completed samples of water will be taken by the Project Manager's Representative for bacteriological analysis by the Employer. If any of the results of the analyses are unsatisfactory when compared with those of the control sample of the supply water the sterilizing process shall be repeated until satisfactory results are obtained. On completion of sterilizing and flushing the pipelines shall be left full of supply water.

The Contractor shall be solely responsible for the provision of all labour, materials and chemicals necessary for carrying out the foregoing operations.

The cost of water used for repeated cleansing, sterilizing and flushing pipelines in accordance with this clause of the Specification will be charged to the Contractor and the Contractor shall be responsible for all temporary works and other arrangements in connection with cleansing, sterilizing and flushing the pipelines.

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

442 Painting

All steel or ductile iron pipes and fittings exposed to view including above ground pipelines shall be painted after making good the external protection with two coats of “Bitumastic Aluminium solution D. 5909” manufactured by Wailes Dove Bitumastic Ltd, Hebburn, Durham, England, or similar approved.

Pipes and fittings in chambers shall be painted with two coats of “Bituros Solution” manufactured by Wailes Dove Bitumastic Ltd, or similar approved. Valves and Surface Boxes shall be similarly painted.

443 Connections to and Diversions to Existing Pipework

443.1 General

The Contractor shall be responsible for connecting new pipework and service connections laid under the Contract to existing pipework, and for blanking-off existing pipework and service connections. The connection shall be made in a manner to minimize any disruption to supply.

Before blanking-off or making a connection to existing pipework the Contractor shall notify the Project Manager in writing no less than 14 days in advance of the date on which he proposes to carry out the work. After giving such notice the Contractor shall obtain from the responsible Authority agreement on the precise date, times and method that the connection will be made. The connection or blanking-off shall be made at such times of the day or night as stipulated by the Project Manager.

The Contractor shall prepare a detailed method statement, programme of the work and a schedule of all plant and materials to be used and shall obtain the approval of the Project Manager not less than 72 hours before commencement of the work. The programme shall allow for the immediate re-commissioning on completion of the work.

The Contractor shall be responsible for locating the exact line and level of the existing pipework and service connections and shall agree with the Project Manager and the responsible Authority the precise location of the connection or blanking-off.

443.2 Materials

Before commencing the connection the Contractor shall excavate trial pits as necessary and shall check the outside diameter of the existing pipework and ensure that the couplings to be used for making connections to the existing pipework and the materials used for blanking-off existing pipework are dimensionally suitable.

The Contractor shall ensure that all the materials are on site not less than 24 hours before the commencement of the work.

443.3 Personnel

The Contractor shall ensure that at least one senior member of his field supervisory staff, who is experienced in such operations and fluent in both English and the language of his labourers is on site throughout the duration of the work.

The Contractor shall also ensure that all necessary skilled artisans and an adequate number of labourers for the operation are on site throughout the work.

443.4 Preliminary Work

The Contractor shall execute all works possible before disconnection of the supply including:-

- a. Excavation and supports to the excavation.
- b. Blinding with concrete the immediate working areas, but not less than the whole of the bottom of the excavation.
- c. Putting in all drains, or where this is not possible a sump of adequate size from which a pump may operate.
- d. Casting the floor of any chamber which is later to be constructed around any of the works.
- e. Casting the thrust blocks or any other works which may be required.
- f. Exposing and cleaning pipes in readiness for the work.

443.5 Carrying out the Work

The Contractor shall be responsible for emptying the section of existing pipework on which the work is to be carried out, by a method agreed with the Authority and approved by the Project Manager.

The Contractor shall take all precautions necessary to prevent dirt and other foreign matter entering the pipelines.

The Contractor shall provide at the Site a sufficient quantity of clean water containing approximately 10 parts per million (10mg/l) of chlorine before proceeding with the cutting of the existing pipeline. Each item of pipework including the joints shall be submerged in the solution for a minimum period of 15 minutes immediately prior to installation.

443.6 Water Pipes and Chambers to be abandoned

Where existing water pipes are to be replaced with new pipework the existing pipework is to be abandoned. Where new works conflict with existing pipework to be abandoned, abandonment of pipework shall consist of removal and disposal to a site approved by the Project Manager. Water supply pipework shall not be abandoned until suitable alternative means of supply are in place and ready for connection.

Where chambers are to be abandoned these shall be broken down and disposed of and the void filled and compacted with suitable material approved by the Project Manager. Chambers deeper than 1 metre will be broken down to 1 metre below finished ground level and the remaining void filled and compacted with suitable material approved by the Project Manager.

SECTION 4C. DRAINS, SEWERS AND MANHOLES

444. 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 Project Manager may direct. 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 Project Manager, the Project Manager 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.

445. 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 Project Manager, 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.

446. Rock Cutting in Trenches for Pipes

Where solid rock is met within trenches, 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 Contractor shall dispose of all surplus material arising from rock excavation in a manner to the approval of the Project Manager.

447. Water in Trenches for Pipelines

Trenches shall be kept free from water at all times during construction of works until, in the opinion of the Project Manager, any concrete or other works therein are sufficiently set, and the Contractor shall construct any sumps or temporary drains that the Project Manager 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 Project Manager 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.

448. Laying and Jointing Rigid Jointed Concrete Pipes

Concrete pipes shall be laid true to line and level, each pipe being separately boned between sight rails.

For spigot and socket joints, the spigot of each pipe shall be placed home in the socket of the one previously laid, and the pipe then adjusted and fixed in its correct position with the spigot of the pipe accurately centred in the socket. A ring of tarred rope yarn shall next be inserted in the socket of each

pipe previously laid and driven home with a wooden caulking tool and wooden mallet, such yarn when in position shall be 25mm in depth. The socket shall then be completely filled with cement mortar 1 to 2 and a fillet of the same worked all round the side. The fillet shall be levelled off and extend for a length of not less than 50mm from the face of the socket.

For 'Ogee' jointed pipes, the joints shall be thoroughly cleaned before laying, and cement mortar, shall be applied evenly to the ends for jointing so as to completely fill the joint. The pipes shall then be neatly pointed with a band of cement mortar approximately 125mm wide and 20mm thick. The inside of each joint shall also be pointed up as the work proceeds.

Special care shall be taken to see that any excess of cement mortar etc. is neatly cleaned off while each joint is being made and any earth, cement or other material cleaned out of the pipes by drawing a tight-fitting wad through them as the work proceeds, or by other approved means. A properly fitting plug shall be well secured at the end of the last laid pipe and shall be removed only when pipe laying is proceeding. The trenches, pipes and joint holes shall be kept free from water until the joints are thoroughly set.

Where shown on the drawings or directed by the Project Manager, concrete pipes shall be bedded and haunched or surrounded with concrete.

449. Pipes Laid with Open Joints

O.G. porous concrete pipes 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 Project Manager with approved broken stone, sand or gravel aggregate, to the gradings as shown on the drawings or stated in the Bill of Quantities.

450. 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.

451. 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 Project Manager. 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.

452. 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.

453. 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 Project Manager. 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 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 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 Project Manager. 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 shall be built in with alternate steps in line vertically and with such additional hand irons as the Project Manager may direct.

All manholes when completed shall be watertight and to the satisfaction of the Project Manager. The prices inserted in the Bill of Quantities shall include for excavation, provision of all materials, construction, refilling and disposal of surplus.

454. Precast Concrete Manholes

Precast concrete manholes shall be supplied and laid generally in accordance with the drawings.

455. Gully Connections

Connections from gullies to sewers and surface water drains or ditches shall consist of concrete pipes and fittings jointed with cement mortar 1 to 3. All pipes, bends and junctions shall be laid to the lines and levels shown on the drawings or as directed by the Project Manager.

456. Surface Boxes, Covers Etc.

Surface boxes, manholes and other covers lying within the site of the works, shall be raised, lowered, altered or removed as directed by the Project Manager.

457. Gullies

Gullies complete with gratings and with rodding eyes where necessary shall be supplied and laid in accordance with the drawings. Where directed by the Project Manager, precast concrete gullies shall be laid on and surrounded with 100mm of concrete of the appropriate grade. The concrete surround is to be brought up to the underside of the frame or flush with the top surface as the case may be. Masonry gullies shall be constructed from 225mm building stone and rendered internally. Gullies shall be trapped where leading into foul sewers or into combined foul and surface water sewers.

458. Completion of Drainage Works

All sub-soil and surface water drains shall be completed in advance of the construction.

459. Temporary Stoppers

Junction pipes which are laid but not immediately connected to gullies shall be fitted with temporary stoppers or seals, and the position of all such junctions shall be clearly defined by means of stakes or training wires properly marked and labelled.

460. Provision for Future Connection to Manholes

Inlet pipes of the required diameters shall be built into the walls of manholes and elsewhere for future use and shall be of the diameters shown on the drawings. The external ends of all such connections shall be sealed off with temporary stoppers, approved by the Project Manager. The pipes shall be laid and jointed and during the placing of the concrete they shall be adequately supported.

461. Surrounding or Haunching of Pipes with Concrete

Surrounding or haunching of pipes shall be carried out using fine concrete. In carrying out this work the Contractor shall take care to pack the concrete under and around the pipes to ensure even bedding and solidity in the concrete and the concrete shall not be thrown directly on to the pipes. The upper surface of the concrete shall be struck off with a wooden screed or template and neatly finished off.

462. Invert Block and Stone-Pitched Drains

Precast concrete invert blocks and side slabs shall be formed of concrete of the appropriate grade and dimensions shown on the drawings. Each course of side slabs required in the Bill of Quantities shall be interpreted as one complete row of side slabs to one side of the channel concerned. Stone used for channels shall be 225mm x 100mm building stone. Drains should not normally be laid to a radius of curvature less than 10 times the actual width of the drain.

Invert block and stone-pitched drains shall be constructed in the positions and to the levels and dimensions shown on the drawings and laid to true line and even fall. Where under-filling is required it shall be in 100mm maximum thickness layers of compacted murram. The earth sides to such channels shall be neatly finished to a slope of 1 to 1 or such other slope as the Project Manager may direct.

Invert blocks and side slabs shall be laid on a 100mm minimum thickness of compacted murram and be neatly jointed with cement mortar 1 to 3 as the work proceeds. The excavation, murram bedding, providing, laying and jointing invert blocks or stone, backfilling and disposal of surplus shall all be as specified and all in-situ connections shall be in concrete of the appropriate grade.

463. 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 Project Manager, and smoke shall then be pumped into 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 Project Manager 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.

464. Pipes with Rubber Ring Joints

Rubber rings shall be entirely suitable for the pipe being used and 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 Project Manager.

465 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.

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 Project Manager. Pipes and fittings shall be checked for deformities prior to laying. Deformed pipes and fittings shall not be accepted.

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.

Expansion Gap

It is necessary to leave a gap between the edge of the spigot end and the base of the socket to allow for expansion. Moulded fittings are supplied with an embossed line indicating the correct depth of insertion. In other cases where the marking is not done, the Contractor shall ensure that an expansion gap of at least 3mm per metre length of pipe or at least 15mm per pipe length is provided. This can be done by marking spigot ends or by pushing spigot fully home, making a small mark on pipe and then withdrawing the pipe by 15mm.

After completing jointing the pipe shall be laid on the prepared bed making sure that a suitable depression is created in the bed for the socket.

Solvent Cement Joints

For solvent cement joints make sure that mating surfaces are clean and free of grease and dirt. Roughen mating surface with sandpaper, clean both surfaces with cleansing fluid using a clean cloth. Apply solvent cement on both mating surfaces. Without delay bring mating surfaces together and hold in position firmly for a few seconds. A layer of cement should be visible at the edges. Joints should not be disturbed for at least 10 minutes after assembly.

SECTION 5. BUILDING AND STRUCTURES

501 Concrete Building Blocks

Concrete building blocks shall be of approved manufacture and shall be formed in a press. The blocks manufactured in Class C30 concrete shall be cured for at least 10 days before use.

Blocks shall be well and evenly formed with true corners and unbroken arises, and shall be carefully handled and stacked.

502 Laying Building Blocks

Joints between blocks shall be filled solid with mortar and shall be of regular thickness of 5 to 10mm. The blocks shall be laid in level courses and bonded so that each vertical joint is midway above the face of the block below, except at junctions and piers where a bond of not less than 100mm shall be provided. The walls shall be raised in lifts not exceeding three metres in height in any one day, and truly vertical. All blocks shall be wetted before being laid.

Joints of exposed work shall be raked out and neatly flush-pointed in the same mortar. The whole of the visible faces of the walls shall be left perfectly clean and all surface mortar and droppings shall be removed before they have set.

Joints in work to be rendered shall be raked out to a depth of 8mm to provide a key for the rendering.

Blockwork shall be tied into adjoining structural members at the same level as blockwork reinforcement using 150mm long butterfly tangs or equivalent fixed and mortared into proprietary vertical strips.

503 Precast Concrete Units Generally

All precast concrete units shall include all fixing plugs and strips to enable screw ties or other fixing devices to be firmly attached. For all precast units to be set in block of masonry walls the plugs and strips shall be so positioned as to provide fixing at course and in no case exceeding 450mm centres.

504 Masonry Using Natural Irregular Stones

Stones shall come from selected quarry layers to the approval of the Project Manager. They shall be homogeneous, frost resistant, flawless, free of any cracks or bousins, solid, and of equal grain and shall have all the required quantities to give a regular facing. They shall give out a clear sound when hit by a hammer.

Mortar shall be removed from the external surface of the wall. The Contractor shall prepare a wall sample approved by the Project Manager which shall be kept at the construction site until all the masonry is completed.

505 Screen Walling

Screen walling shall consist of perforated precast concrete blocks 100mm thick of approved shape, design and manufacture laid to an approved pattern in cement mortar with perfectly even joints which shall be neatly flush or recess pointed as directed.

506 Damp-Proof Course

All external walls of buildings are to be provided with damp-proof course (DPC) of textured PVC strip of width equal to the total thickness of the wall and any external rendering. The DPC is to be lapped with the damp-proof membrane and bedded in mortar specified for the type of block used. The greatest lengths possible are to be used for the DPC's but any end laps required are to be at least 200mm long made dry without intervening mortar. Piers are to have complete DPC's lapped with the wall DPC.

507 Damp-Proof Membrane

Damp-proof membranes shall be laid, as directed by the Project Manager, beneath all floor slabs resting on the ground. They shall be composed of single sheets of minimum thickness 0.300mm black polyethylene film of an approved manufacturer specially made for use as damp-proof membrane.

The film shall be laid on sand and turned up around all edges of the slab and with 150 mm margin above the top of the slab to be tucked into the perimeter walls of the building. Where the building is so large as to exceed the maximum sheet size available, several sheets shall be used and the joints shall be lapped 150mm and fused together using a welding tool designed for that purpose. Every care should be taken by the following trades to prevent perforation of the membrane but in the event of the puncture the perforation shall be covered by a patch of similar material of dimensions exceeding the area of the puncture by 300mm and the two sheets welded together as described above.

508 Composition of Mortars

- a. Cement mortar for bonding concrete shall be composed of cement and sand mixed in the proportion of the jointed concrete.
- b. Cement mortar for setting precast concrete or pitching shall be composed of cement and sand mixed in the proportion of 50kg of cement to 0.14m³ of sand, with the addition of an approved plasticizer.
- c. Cement mortar for blockwork in concrete blocks shall be composed of cement and sand mixed in the proportion of 50kg of cement to 0.14m³ of sand.
- d. Sand and Cement for mortars shall be as described in the specification for concrete.

509 Mixing of Mortars

The materials of mortars shall be measured out in their correct proportions and shall first be thoroughly mixed together in a dry state by turning them over upon a clean wooden stage until they are of a homogeneous appearance in consistency and colour. Clean water shall then be added while the mixture is being turned over until it attains a suitable consistency. Plasticizer shall be added in accordance with the manufacturer's recommendations as approved by the Project Manager.

The mortar shall be used immediately after it has been mixed. No mortar which has commenced its first set shall be used, or mixed up again. Mortar shall, where possible in hot weather, be protected from too rapid action by covering with impervious material such as polyethylene film.

Mixing by hand will be allowed only if the Project Manager gives specific approval. Mixing by machine using the same sequence of operations described above shall be carried out whenever possible.

510 Cement Rendering

Rendering shall be in a 50 kg to 125kg cement: sand mix but where approval had been given to the use of a plasticizer or other additives these proportions may be modified to the approval of the Project Manager.

All surfaces to receive a finishing coat of cement rendering or fine concrete shall be thoroughly prepared and cleaned and the rendering or screeding shall be placed immediately after such surfaces have been thoroughly wetted.

All rendering shall be put to a minimum of two coats, the first being left rough to a minimum of 10 mm thickness, but the second coat shall be trowelled up to a fair faces as soon as possible after it is applied.

All internal rendering shall be finished to an even and polished surface with a float, trowel or other suitable tool, special care being taken to obtain perfectly smooth and glazed faces. It shall not be less than 15mm thickness when finished unless instructed otherwise.

All external rendering shall be brought to an even surface with a wood float following which a tyrolean finish of approved colour shall be applied unless otherwise stated.

All rendering shall be protected from sun and rain by adequate and suitable coverings which shall be supplied and fixed in advance of these conditions arising. The renderings shall be kept damp while setting and protected from drying winds.

511 Tanking to Buried Concrete Surfaces

External concrete surfaces to be tanked shall be coated with a bituminous waterproofing membrane 3mm minimum thick. The tanking shall be dressed into structure as shown in the Drawings and be protected by non-rotting boarding prior to backfilling.

512 Waterproof Rendering

Waterproof rendering slurry shall comprise a 50kg to 125kg cement sand mix with an approved waterproofing admixture such as styrene acrylate copolymer.

The material shall block capillaries and minor shrinkage cracks to prevent water ingress while allowing the passage of water vapour through the structure.

The render shall be applied to a total thickness of not less than 20mm the first coat shall be applied levelled scratched and left to dry for not less than 3 days.

513 Grouting in Ironwork

All brackets, rag-bolts and other ironwork for which holes have been boxed out or left in the concrete of a structure shall be carefully grouted in to their correct positions in all particulars. The grouting in shall be carried out with cement and sand grout in such a manner that there shall be no apparent difference in the texture or colour throughout the face of the finished structure and that there shall be no seepage of water either between the ironwork and the set grout or between the set grout and the surrounding structure.

The above instructions shall apply also to the building-in of pipes except that Class C25/10 concrete shall be used in lieu of cement grout.

All holes left for building-in shall be free from any sign of infiltration of water before the building-in is carried out. No reliance shall be placed upon the building-in process for the sealing of such leakage.

514 Cable Duct Covers and Frames

514.1 Recessed Covers

Cable duct covers recessed for flooring finishes shall be provided with galvanized rolled steel angles of height equal to the thickness of the floor finishing and fixed to the surface of the structural floor slab along all edges of the trenches so that the top edge is level with the finished floor level. The angle shall be laid so as to form seating for duct covers and all additional galvanized rolled steel tee sections shall also be provided to support the duct covers.

The duct covers shall be galvanized to suit the ducts and the seating described above. A lightweight galvanized steel mesh shall be fixed to the upper surface of the trays to provide a key for floor finishes. The seating and trays shall be so laid that the finished floor is perfectly level and all trays fully supported at all edges without the use of loose packing. At least one tray in every series of trays covering a length of duct shall be provided with cast-in lifting eyes and a pair of suitable lifting keys shall be handed to the Project Manager on completion.

514.2 Checker Plate Covers

Checker plate covers shall be hot dipped galvanized mild steel fitted flush with the floor surface and fully supported.

515 Fences and Gates

Fences generally shall be in accordance with the relevant parts of BS 1722 Part 1: 1986. Chain link fencing shall be Type PL.213 Grade A with 1.8 m high plastic covered chain link mesh. The mesh and line wires shall be galvanized prior to being plastic covered. The posts shall be reinforced concrete.

The straining posts, intermediate posts and struts shall be manufactured and erected complete as specified in BS 1722. The fencing shall be true to line and vertical, following profile of the ground, previously graded so as to prevent access beneath the bottom wire. Gates shall be hung on adequate post, and shall be truly vertical.

Ornamental fabricated metalwork fences and gates shall be constructed of mild steel bar, strip or tube in accordance with the Drawings. All welded joints and drillings for bolts shall be made before painting, and all bolts, nuts and washers shall be galvanized or plated in an approved manner. Any metalwork sunk into the ground shall be treated with two coats of bituminous paint.

516 Joint Sealing Compound and Sealants

Joint sealing compounds shall be impermeable ductile materials of a type suitable for the conditions of exposure in which they are to be placed, and capable of providing durable, flexible and watertight seal by adhesion to the concrete throughout the range of joint movement.

Hot poured joint sealants shall comply with BS 2499, Ordinary Type A1 sealant.

Cold poured polymer-based joint sealants shall comply with BS 5212: Part 1, Normal Type N sealant.

Two part polysulphide based sealants shall comply with the relevant provisions of BS 4254. Pouring Grade shall be applied to horizontal upward facing joints and Gun Grade to joints of any other aspect or inclination. Other two part polymer based sealants of Gun or Trowel Grade shall comply with the physical and test requirements of BS 4254.

Silicon bases building sealants shall comply with the relevant provisions of BS 5889. Primers for use with joint sealants shall be compatible with, and obtained from the same manufacturers as, the adjacent sealant. Primers shall have no harmful effects on the concrete.

Sealants and primers which will be in contact with water to be used for potable supply shall not impart to water taste, colour, or any effect known to be harmful to health, and shall be resistant to bacterial growth. Sealants and primers which will be in contact with sewage or sewage sludge shall be resistant to biodegradation.

517 Openings in Walls, Floors and Ceilings

The Contractor shall chase put and/or cut openings through walls, floors and ceilings for the passage of pipes and cables where described in the contract shall provide and fix in position approved tube sleeve cut off flush with the finished surface. All openings and ducts shall be sealed on completion to prevent the passage of toxic or explosive gases.

518 Structural Steelwork

Material for structural steel work shall comply with BS EN 10137 and workmanship with BS 5950. The steelwork shall be securely fixed to the foundations or building and designed to have such strength and stiffness that its deflection and movement under the loads to be applied shall be within tolerable limits.

All bolts and nuts shall comply with the requirements of BS 3693 except for High Strength Friction Grip Bolts which shall comply with BS 4395.

Mild steel electrode shall comply with the requirements of BS EN 499 and High Yield Steel with BS 2540.

All structural steel fabrication shall conform to the requirements of BS EN 5400. The use of High Strength Friction Grip Bolts shall be in accordance with BS withdrawn.

All structural steel work shall be fabricated using welded joints where possible for shop joints and bolted joints for field assemble.

519 Open Mesh Walkways and Covers

Open mesh type walkways, platforms and covers shall be of aluminium or galvanized steel, suitable for a superimposed load of not less than 6kN/m². The walkways, platforms and covers shall include all necessary supports not detailed on the Drawings.

Open mesh panels shall be trimmed with full depth nosing bar along all edges and bolted to each other when in place to help ensure a firm walkway. Panels shall be cut in such a way and fixing so as to provide a continuity of pattern.

Covers shall incorporate a hinged lockable open mesh access panel with a 750 x 750mm clear opening, strong durable hinges and heavy duty non-corrodible padlock. Openings for valve keys shall be just sufficient in size for the valve key and shall incorporate a cover hinged only.

All panels shall be securely bolted to the supporting structure. Where the supporting structure is concrete, galvanized mild steel angle curbs shall be provided and securely grouted into rebates left in the concrete such that the tops of the panels are flush with the top of the concrete.

520 Handrailing

Hand railing shall be approximately 1000mm in height with an intermediate horizontal rail with standards not more than 2000mm apart. Hand railing shall be designed for a horizontal loading of not less than 220N/mm. Hoops shall be welded on where required for fixing guard chains. Standards and rails shall be manufactured from black mild steel tube to BS 1387:1985, from steel tubing to BS 1775 or from extruded aluminium alloy approved by the Project Manager. The nominal bore of steel tubing shall be not less than 32mm. Adequate provision shall be made for thermal movement. Steel hand railing shall be hot dipped galvanized after fabrication.

521 Guardrail

Guardrails shall be 750mm in height with a single top rail. In all other respects it shall comply with the specification for hand railing.

522 Chains

Chains across openings in handrails at tops of ladders shall be galvanized mild steel having 3 SWG x 3 links per 100mm and shall be supplied complete with 'S' hooks and split rings.

523 Steel Access Covers

Steel access covers shall be to the duty required and sized to suit the opening shown on the Drawings. They shall be complete with frame and shall be weatherproof (prevent ingress of water) when closed and shall in all respects be strong and durable.

The covers shall be hinged and lockable and provided with stays to prevent the covers opening more than 105°. The Contractor shall provide with each cover a heavy duty non-corrodible padlock and four keys. The covers and frames shall be galvanized.

524 Isolation of Aluminum

All items of aluminium construction shall be isolated from concrete by the use of bituminous felt or DPC material or two coats of bituminous paint. The aluminium shall be isolated from dissimilar metal by the use of fibre washers and spacers.

525 Galvanising

Where galvanizing has been specified the items shall after fabrication be hot dipped galvanized in accordance with BS 6530 Part 1 to a thickness of 0.15mm (005'). All items to be protected shall be prepared as specified in the above standards. Articles altered at the manufacturer's works in any way after galvanizing are to be re-galvanized as specified. Articles subject to minor alternations at site or

requiring minor repair at site shall be wired brushed to remove all rust and coated with 3 coats of approved zinc rich cold galvanizing compound.

526 Fixings to Structure, etc.

Where fixings to structures previously constructed are to be made by setting a bolt system into performed holes, such fixings shall be made either by Rowlbolt Projecting Bolt Type or by using an approved proprietary resin anchor system. Where performed holes have not been provided a self-drilling expanding bolt system shall be used.

Where thin sections are involved or where stresses are likely to be set up which might cause damage to the structure the use of the resin anchor system only will be permitted. Only in special circumstances will the Project Manager or the Project Manager's Representative permit rowlbolts to be uses. Performed holes shall be accurately set to template prior to placing the surrounding concrete and shall be kept rigidly in place until the concrete has properly set.

Where resin anchorage is used the Contactor shall ensure that the setting time of the resin is appropriate to the requirements for setting up, plumbing and aligning the work before is sets. Bolts shall be set to template and hole diameters shall conform to the recommendation of the suppliers. Whatever system is used, all bolts shall be plated to resist corrosion.

SECTION 6. ROADS AND SURFACING

601 Access Tracks

Permanent access tracks shall be constructed only where shown on the Drawings. Tracks shall be unsurfaced. Filling to bring formation to the required level shall be locally excavated material which shall be placed in layers and compacted by tracking with the excavation plant. The road formation shall be tracked and graded with a dozer blade or bucket to give a cross fall of not less than 1 in 40. Surface undulations shall not exceed 200mm over a length of 3.0m, unless otherwise approved by the Project Manager.

The maximum gradient shall not exceed one vertical to 6 horizontal and the minimum turning circle radius measured to track centre line shall not be less than 15.0m.

602 Access Roads

The road formation shall be the surface obtained after completion of any earthworks. Filling to bring the formation to the required level shall be selected material. It shall be laid and compacted in layers not exceeding 150mm in thickness, the compaction being carried out by a roller of not less than 8 tonne weight.

The Employer and the Contractor may at any time after the completion of the access road (after 14 days in the case of concrete surfaces) use them or allow their use by their employees or sub-contractors.

At such times during the Period of the contract or Period of Maintenance as the Project Manager may direct, the Contractor shall at his own expense make good any deterioration which may have occurred in the condition of the roads, whether as result of the use of roads by the Employer or otherwise. In particular, any parts of the foundations into which soil has penetrated shall be dug out and replaced with clean materials.

602.1 Macadam Roads and Macadam Hardstandings

(i) The sub-base shall consist of 150mm compacted thickness of free draining granular material conforming to the grading limits specified in the contract. The plasticity index shall be 0-6% maximum and the California Bearing Ratio at maximum density (Test 12, BS 1377:1990) shall be 25% minimum. The material shall be compacted to 95% of the maximum density as determined by Test No. 13, BS 1377:1990 (heavy compaction) by means of a roller of not less than 8 tonnes weight.

If the quality of foundation soil is considered inadequate, the Project Manager may direct that the sub-base be 300mm thick, in which case construction shall be carried out as described above but as two 150mm thick layers.

The road base shall consist of 150mm compacted thickness of free draining crushed limestone conforming to the grading limits stated in the Contract. The plasticity index shall be 0-6% maximum and the California Bearing Ratio at maximum density (Test 13, BS 1377:1990) shall be 80% minimum.

The base shall have a prime coat applied not more than seven days after the completion of the base and not later than twenty four hours after approval by the Project Manager. The asphalt used for the prime coat shall generally conform to the relevant AASHTO specification.

Before laying the tarmacadam base course onto the primed base, all loose blinding material shall be brushed off the road and removed. The tarmacadam base course shall consist of 60mm compacted thickness of 20mm nominal size dense base course macadam. The aggregate and asphalt shall be generally in accordance with the relevant AASHTO specification.

A tack coat shall be applied between successive layers of asphalt material and shall generally conform to the relevant AASHTO specification. Machine laying shall normally be used and compaction shall be carried out with a roller of not less than 12 tonnes weight so as to achieve a dense, smooth and even surface. Where new road construction is to be joined to an existing road, the surface shall be cut back to a straight line and primed.

(ii) Should the Contractor wish to lay Macadam on the roads early in the Contract for use by the construction traffic, he may do so provided construction is stopped at completion of the Macadam base course and this single layer blinded with bituminous grit to seal the surface.

When all concreting, earth moving and heavy crainage and haulage has been completed, and in general towards the end of the Contract, the base course so provided shall be thoroughly cleaned off and repaired, and re-levelled where necessary, and a suitable cold bituminous emulsion tack coat generously applied by spray in accordance with the manufacturer's instructions, care being taken to avoid spattering kerbs or other adjacent concrete. The wearing course may then be laid and blinded as described in sub-section (i) above. Any additional costs involved in the adoption of the method of laying described in this sub-section shall be included by the Contractor in his rates for road making.

(iii) Notwithstanding the time of placing of the roadworks, the condition of the finished road at the completion of the Contract shall be of 'as new' quality, with clean, accurately profiled, rolled and sealed surface throughout, free from concrete spotting or staining, patch marks, trench outlines, paint, oil or fuel spillages or other visible or structural defects.

602.2 Unsurfaced Roads and Hardstandings

Unsurfaced roads and hardstandings shall be constructed from 300mm of crushed lime stone conforming to the grading limits specified in the Contract, laid in two layers of 150mm.

Each layer shall be compacted to 95% of the maximum density (Test 12, BS 1377:1990).

602.3 Pea Shingle Surfaced Areas

The sub-base to pea shingle areas shall be as defined in 801.1 above. Pea shingle consisting of 20mm thick 5mm nominal single sized stone laid and raked to a level finish.

603 Precast Concrete Kerbs and Channels

Kerbs shall be laid before the adjacent carriageway is constructed and sufficiently in advance to meet the Project Manager's requirements. Kerbs shall be bedded solidly and accurately in their concrete foundations before the initial set of the concrete has started. Each kerb shall be set solidly and accurately to the required line and level with joint no more than 6 mm wide, neatly pointed with cement mortar and filled for their full depth with cement grout as specified. At every tenth kerb joint, the pointing and grout shall be omitted. A piece of 4mm thick approved jointing material shall be placed in these joints, neatly trimmed to be flush with the face of the kerb. The bedding shall be well haunched up to the back of the kerb, to within 100mm of the top of the kerb. All cutting shall be neatly formed so as to show no damage to the exposed faces and to leave the ends square for the full width of the kerb.

The kerbs and channels shall be 130mm wide by 250mm deep. Kerbs shall be half battered. Kerbs damaged at the exposed faces will not be accepted.

604 Precast Concreting Edging

Edging shall be 50mm x 150mm in size. Edging shall be laid in the same manner as kerning and in short lengths, where required to be circular on the plan.

605 Footpaths and Paving

For surfaced footpaths and similar paved the base material shall be laid on hard fill or selected materials as directed by the Project Manager's Representative and compacted by a roller of 0.75 to 3 tonnes weight. The footpath base shall be formed of crushed rock graded from 50mm to 10mm suitable for the purpose and laid as wet-mix or dry macadam and rolled or compacted to the final form and grading of the final surfacing to a thickness of 100mm.

The base course shall consist of 100 mm compacted thickness of bituminous macadam of 14mm nominal sized material. After laying and rolling the base course, a wearing course shall be laid to provide a final finish. This shall consist of 15mm compacted thickness of 100mm nominal size bituminous macadam. As soon as possible after laying the wearing course, it shall be blinded with bituminous grit (fine cold asphalt) to weather-seal.

For concrete paving, the precast concrete flags shall be of approved colour and size not less than 30mm thick unless otherwise indicated. They shall be laid and bedded in cement mortar upon a 100mm thick bed of compacted crushed limestone.

The Contractor will be required to lift and relay at his expense flags which have sunk through consolidation of settlement of the ground beneath and the Project Manager's maintenance certificate will not be issued until such work has been completed to his satisfaction.

606 Laying to Grade

All new and reinstated roads, alleyways and hard standings shall be completed in a manner that ensures cross-falls are towards the storm water drainage intakes.

SECTION 7 SAFETY, HEALTH AND ENVIRONMENT

701 Introduction

The prevention of injury and/or illness to the site personnel and the public, damage to the Works and to public and private property, protection of the environment, and compliance with applicable laws, are primary objectives of the Employer. Because of the importance the Employer places on meeting these objectives, selected minimum requirements are outlined in these Safety, Health and Environmental Specifications with which Contractors shall comply while working on this contract. Given that these Specifications cannot cover every eventuality, the Contractor shall be expected to exercise good judgment in all such matters, even though not mentioned in these Specifications, and shall take any and all additional measures, as required or necessary, to meet his responsibility for safety, health and environmental matters during the period of the Contract.

The Employer nor its representatives shall not be held liable for any actions taken by the Contractor that are attributed to following the minimum requirements stated hereinafter.

The Contractor shall throughout the execution and completion of the Works and the remedying of any defects therein:

- (a) have full regard for the safety of all persons on the Site and keep the Site and the Works in an orderly state appropriate to the avoidance of danger to any person;
- (b) know and understand all laws governing his activities along with any site requirements and work site hazards. Such information shall be communicated by the Contractor to his personnel and subcontractors;
- (c) take all necessary measures to protect his personnel, the Employer's personnel, other persons, the general public and the environment;
- (d) avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequent of carrying out the Works.

702 Compliance with Specifications

The Contractor shall comply with the requirements of these Safety, Health and Environmental Specifications and all other applicable regulations or requirements under Kenyan laws, laid down by relevant authorities or issued by the Employer or the Project Manager concerning safety, health and the environment, in force or introduced or issued from time to time during the period of the Contract.

In so far as these Specifications are applicable, they shall apply to sites and personnel outside the Site associated with the performance of the Contract.

The Specifications equally apply to subcontractors and all other parties engaged by the Contractor and their personnel. The Contractor shall ensure all such parties are fully aware of and comply with the Specifications.

The Contractor shall comply with all notifications and written or verbal instruction regarding safety issued pursuant to these Specifications by the Employer, Project Manager or relevant authorities within the time specified in the notification or instruction.

The Contractor shall adopt a positive approach, awareness and responsibility towards safety, health and the environment, and take appropriate action, by:

- (a) ensuring the Specifications are enforced and followed by the Contractor's personnel. Any failure by the Contractor's personnel to follow the Specifications shall be regarded as a failure by the Contractor.
- (b) paying attention to possible injury to unauthorized persons entering the site, particularly children.

Whenever in these Specifications the Contractor is required to provide test certificates for equipment and personnel and to comply with the relevant authorities' requirements and no independent test facilities are available or no relevant authorities exist in Kenya, the Contractor shall provide:

- (a) in lieu of independent test certificates:
 - for equipment – details of the tests that have been carried out by the Contractor and a written statement that the Contractor has satisfied himself that the item of equipment is fit and safe for use;
 - for personnel – details of the training and experience of the personnel and a written statement that the Contractor has satisfied himself that they have the required level of competency;
- (b) in lieu of relevant authorities' requirements – details of the Contractor's own rules, regulations, requirements and procedures regarding safety, health and the environment.

If the Project Manager is dissatisfied with the details provided by the Contractor, the Contractor shall provide further details or carry out further tests or provide further written statements as may be reasonably required by the Project Manager.

When the Project Manager has satisfied himself regarding the Contractor's own rules, regulations, requirements and procedures provided in accordance with (b) above, such rules, etc. shall be deemed to form part of these Specifications and to which Clause 3 shall equally apply.

703 Failure to Comply with Specifications

703.1 General

Should the Contractor fail to comply with any of the Specifications or requirements of the Project Manager:

- (a) the Project Manager may suspend the Works of part of the Works until the Contractor has taken the necessary steps, to the satisfaction of the Project Manager, to comply with the Specifications or requirements.
- (b) the Employer may, following written notice to the Contractor, carry out themselves or arrange for another contractor to carry out such measures as they may consider

appropriate on behalf of the Contractor. Any such actions by the Employer shall not affect or diminish the Contractor's obligations or responsibilities under the Contract.

- (c) the Project Manager may, by written notice of suspension to the Contractor, suspend all payment to the Contractor under the Contract if the Contractor fails to rectify any breach of the Specifications within the period specified by the Project Manager, provided that such notice of suspension:
- (i) shall specify the nature of the failure or failures; and
 - (ii) shall request the Contractor to remedy each such failure within a specified period after receipt by the Contractor of such notice of suspension.

Such suspension of payment shall remain in force until such time as the Contractor has rectified the breach or breaches to the satisfaction of the Project Manager. No interest shall be paid on the suspended payments.

Failure to comply with the Specifications or requirements shall be considered a breach of the Contract by the Contractor and may result in termination of the Contract by the Employer. In the event of the Employer taking action based on this Clause, the Contractor shall not be entitled to any additional costs or extension to the Contract Completion Date. All costs incurred by the Employer pursuant to Sub-Clause 703.1.1 (b) shall be deducted from the amounts otherwise due to the Contractor.

704 General Requirements

Preamble

All references to safety shall be deemed to include health and the environment.

Safety Officer

The Contractor shall appoint a competent Safety Officer who shall be responsible for safety, health and the environment. The Safety Officer shall be given sufficient time by the Contractor to carry out his duties; minimum requirements shall be as follows:

Workforce on site of over 250	- full time Safety Officer;
Workforce on Site of 100 – 250	- 50% of Safety Officer's time;
Workforce on site below 100	- as required for the Works but a minimum of 5 hours per week of Safety Officer's time where more than 20 workers.

The Contractor shall provide the Safety Officer with appropriate identification, including a white hard hat with red cross symbol and an identification badge. The appointment of the Safety Officer shall be in writing and copied to the Project Manager. The appointment shall include specific instructions to enforce these Specifications and delegated authority to take any action, measure or to issue instruction regarding their enforcement. All persons on Site shall be made aware of the name and

authority of the Safety Officer and instructed to comply with any instruction or direction in safety matters, verbal or in writing issued by the Safety Officer.

The Safety Officer shall be provided with a mobile phone or other similar means of communication. The Safety Officer shall be accessible and available at all times including normal working hours.

Safety Training

The Contractor shall provide safety induction training for all site personnel upon starting on site. The Contractor shall provide safety refresher/reinforcement training at regular intervals for his staff.

Safety Meetings

The Contractor shall hold regular safety meetings to provide safety instructions and receive feedback from site personnel on safety, health and environmental matters. A weekly safety Meeting shall be chaired by the Safety Officer and minutes shall be taken of the meeting. The meeting/minutes shall be given to the Project Manager. The Safety Officer should attend the Contractor's weekly site meetings and "Safety" shall be an item on the agenda.

Safety Inspections

The Safety Officer shall make regular safety inspection of the work site. The Safety Officer shall prepare a report of each inspection. This report shall include details of all breaches of these Specifications and any other matters or situations relating to safety found during the inspection, instructions issued by the Safety Offices and actions taken by the Contractor. A copy of the Safety Officer's reports shall be given to the Project Manager.

Control of Substances Hazardous to Health

Hazardous materials shall be stored in approved safety containers and handled in a manner specified by the manufacturers and/or prescribed by relevant authorities.

Only properly trained and equipped personnel shall handle hazardous materials.

Potential Hazards

The Contractor shall inform employees of potential hazards, take the appropriate steps to reduce hazards and be prepared for emergency situations. The Contractor shall make an assessment of every operation involving hazardous substances. The assessment shall be recorded on a Hazardous and Flammable Substances Assessment Method Statement which shall be submitted to the Project Manager prior to the delivery and use of the substance on Site.

Accident Reporting

The Contractor shall report all accidents and dangerous occurrences to the Project Manager. The Contractor shall prepare a report on each accident or dangerous occurrence and a copy of the report, together with witness statements and any other relevant information, shall be submitted to the Project Manager. A reportable accident or dangerous occurrence shall include any accident to any person on site

requiring medical attention or resulting in the loss of working hours or any incident that resulted, or could have resulted, in injury, damage or a danger to the Works, persons, property or the environment.

In the event of an accident or dangerous occurrence, the Contractor shall be responsible for completing all statutory notifications and reports. Copies of all statutory notifications and reports shall be passed to the Project Manager.

All accidents and dangerous occurrences shall be recorded in a Site Accident Book. The Site Accident Book shall be available at all times for inspection by the Project Manager.

The Contractor shall immediately rectify any situation or condition that could result in injury, damage or a danger to the Works, person, property or the environment. If the situation or condition cannot be corrected immediately, the Contractor shall provide temporary barriers and appropriate warning signs and devices and/or take other appropriate action necessary for the protection of persons, property and the environment.

Notices, Signs, Etc.

All safety, health, environmental and other notices and signs shall be clearly displayed and written in English. All requirements, instructions, procedures, etc. issued by the Contractor concerning these Specifications shall be printed in English and displayed and readily available to the Contractor's personnel.

First Aid and Medical Attention

The Contractor shall have comprehensive First Aid Kit(s) on Site at all times. First Aid Kits shall be conveniently located and clearly identifiable.

The Contractor shall have one employee on site trained in first aid for every 25 employees. Such persons shall be provided with appropriate identification, including a red hard hat with a white "red cross" symbol; and an identification badge.

The Contractor shall make contingency arrangements for calling a Doctor and transporting injured persons to hospital. The telephone numbers of the emergency services and the name, address and telephone number of the Doctor and nearest hospital shall be prominently displayed in the Contractor's site office.

Employee Qualification and Conduct

The Contractor shall employ only persons who are fit, qualified and skilled in the work to be performed. All persons shall be above the minimum working age. Contractor's personnel shall use the toilet facilities provided by the Contractor.

The Contractor shall ensure:

- (a) that no firearms, weapons, controlled or illegal substances or alcoholic beverages are brought onto the Site and that no personnel under the influence of alcohol or drugs are permitted on Site.
- (b) That all personnel obey warning signs, product or process labels and posted instructions.
- (c) That drivers or operators of vehicles, machinery, plant and equipment follow the rules

for safe operations. Drivers shall wear seat belts and obey all signs and posted speed limits.

705 Safety Requirements

Personal Protective Equipment

The Contractor shall provide personal protective equipment, including hard hats, safety glasses, respirators, gloves, safety shoes, and such other equipment as required, and shall take all measures or actions for the protection and safety of Contractor's personnel.

Non-metallic hard hats shall be worn at all times by all personnel at the worksite with the exception of those areas where the Project Manager has indicated it is not necessary to do so. Safety glasses shall meet international standards and be available for use and worn in specified worksite areas. As a minimum, safety glasses shall be worn for the following types of work: hammering, chipping, welding, grinding, use of electrically powered or pneumatic equipment, insulation handling, spray painting, working with solvents, and other jobs where the potential of an eye injury exists. Face shields and/or goggles shall be worn where possible exposure to hazardous chemicals, cryogenic fluids, acids, caustics or dust exists and where safety glasses may not provide adequate protection.

When handling acids, caustics and chemicals with corrosive or toxic properties, suitable protection, such as acid suits or chemical resistant aprons and gloves, shall be worn to prevent accidental contact with the substance.

Personnel shall not be permitted to work whilst wearing personal clothing or footwear likely to be hazardous to themselves or others.

The wearing of safety shoes with steel reinforced toes is recommended for all Contractor's personnel on site. In all cases, Contractor's personnel shall wear substantial work shoes that are commensurate with hazards of the work and the work site area.

Hearing protection, including muffs, plugs or a combination thereof, shall be provided for all personnel operating in areas where the noise level exceeds 90 decibels. Such protections shall also be provided for operators working with equipment exceeding such a level. This may include equipment such as excavators, shovels, jackhammers, saws, drills, grinders and the like are being used.

The Contractor shall encourage employees to wear substantial work gloves whenever practical and safe to do so.

Fire Protection and Prevention

The Contractor shall comply with fire protection instructions given by the Authorities having jurisdiction in regard to fire protection regulations. The Contractor shall, upon moving on site, provide to the Project Manager and the Authorities a fire prevention and evacuation plan. This shall include drawing(s) showing the fire assembly points. The fire prevention and evacuation plan and drawing(s) shall be updated from time to time as the Works progress. The Contractor shall ensure all personnel are fully informed on escape routes and assembly points and any changes thereto. Fuel storage will not be permitted in construction work areas. Contractors may establish fuel storage tanks in specified areas set aside for the purpose and approved by the Project Manager. Storage tanks shall be adequately banded to control spillage. Fire extinguishers shall be provided and installed in a suitable nearby location.

Highly combustible or volatile materials shall be stored separately from other materials and as prescribed by relevant authorities and under no circumstances within buildings or structures forming part of the permanent Works. All such materials shall be protected and not exposed to open flame or other situations which could result in a fire risk.

No combustible material shall be located inside or within 10 metres of a building or structure forming part of the permanent Works. Where units have to be used in these circumstances, they shall be constructed of non-combustible materials and have a half-hour fire rating inside to outside and outside to inside. Non-combustible furniture shall be used where practical.

All temporary accommodation and stores shall be provided with smoke detectors and fire alarms. Smoking shall be banned in high risk areas.

Expanded polystyrene with or without flame retarding additive, polythene, cardboard and hardwood shall not be used as protection materials. Plywood and chipboard shall only be used as protection on floors. Vertical protection shall be non-combustible. Debris netting and weather protection sheeting shall be fire retardant.

When using cutting or welding torches or other equipment with an open flame, the Contractor shall provide a fire extinguisher close by at all times. All flammable materials shall be cleared from areas of hot works or work locations prior to welding or oxy/gas burning operations. All hot works shall cease half an hour before the end of a work shift to allow for thorough checking for smouldering materials. Where appropriate, areas of hot works are to be soused in water before the shift ends.

An adequate number of fire extinguishers of types suited to the fire risk and the material exposed shall be provided. These shall be placed in accessible, well-marked locations throughout the job site. Contractor's personnel shall be trained in their use. Extinguishers shall be checked monthly for service condition and replaced or recharged, as appropriate after use.

Only approved containers shall be used for storage, transport and dispensing of flammable substances. Portable containers used for transporting or transferring gasoline or other flammable liquids shall be approved safety cans. Fuel burning engines shall be shut off while being refuelled. Adequate ventilation to prevent an accumulation of flammable vapours shall be provided where solvents or volatile cleaning agents are used.

Flammables shall not be stored under overhead pipelines, cable trays, electrical wires or stairways used for emergency egress. Paints shall be stored and mixed in a room assigned for the purpose. This room shall be kept under lock and key.

Oily waste, rags and other such combustible materials shall be stored in proper metal containers with self-closing lids and removed every night to a safe area or off site. Every precaution shall be taken to prevent spontaneous combustion.

Electrical Safety

All temporary electrical installations, tools and equipment shall comply with current regulations dealing with on-site electrical installations. The Contractor shall establish a permit-to-work system for work in or in proximity to energized circuits of any voltage. Contractor's personnel shall not commence work on such circuits unless a permit to work has been issued and adequate safety measures have been taken and the work operation has been reviewed and approved by the Project Manager.

Only authorized personnel shall be allowed to work or repair electrical installations and equipment. Portable tools and equipment shall be 240 volt, unless otherwise agreed by the Project Manager.

When portable or semi-portable equipment operates at voltages in excess of 240 volts, the supply shall be protected by a Residual Current Device (RCD) regardless of any such device fitted to the equipment. The RCD must have a tripping characteristic of 30 milliamps at 30 milliseconds maximum.

All static, electrically powered equipment, including motors, transformers, generators, welders and other machinery, shall be properly earthed, insulated, and/or protected by a ground fault interruption device. In addition, the skin metal buildings and trailers with electric service shall be earthed. Metal steps, when used shall be securely fixed to the trailer.

Lampholders on festoon lighting shall be moulded to flexible cable and be of the screw in type. Clip on guards shall be fitted to each lamp unit.

All tungsten-halogen lamps shall be fitted with a glass guard to the element. These lamps must be permanently fixed at high level.

Electrical equipment shall be periodically inspected and repaired as necessary by competent persons.

Any work in electrical equipment and systems shall be made safe through locking, tagging, and/or isolation of the equipment before work commences. Prior to the start of the work, the equipment or systems shall be tested to ensure that they have been properly de-energised and isolated.

Electrical repair work on energized systems shall be avoided whenever possible.

Electrical trouble shooting shall be conducted only after getting written approval of the Project Manager.

Unauthorized personnel shall not enter enclosures or area containing high voltage equipment such as switchgear, transformers or substations.

Oxygen/Acetylene/Fuel Gases/Cartridge Tools

Compressed oxygen shall never be used in the place of compressed air. Flash-back (Spar) arrestors shall be fitted to all gas equipment. Liquid petroleum Gas (LPG) cylinders shall not be stored or left in areas below ground level overnight. Cylinders must be stored upright.

The quantity of oxygen, acetylene and LPG cylinders at the point of work shall be restricted to a maximum of one day's supply. Cylinders shall be kept in upright vertical rack containers or be safely secured to a vertical support.

Cartridge tools shall be of the low velocity type. Operators must have received adequate training in the safe use and operation of the tool to be used.

Scaffolding/Temporary Works

No aluminium tube shall be used, except for proprietary mobile towers, unless otherwise agreed with the Project Manager.

Drawings and calculations shall be submitted to the Project Manager, prior to commencement of work on the site, for all Temporary Works, including excavations, falsework, tower cranes, hoists, services and scaffolding. Designs shall conform to international standards.

The Project Manager will not approve Temporary Work designs but the Contractor shall take account of any comments on such designs made by the Project Manager.

The Contractor shall inspect and approve all Temporary Works after erection and before access, loading or use is allowed. Completed and approved Temporary Works shall be tagged with a scaff-tag or similar safety system and the Safe Structure insert displayed. For scaffolding, one tag shall be displayed every 32 m² of face area. A central record system shall be kept on all Temporary Work. Temporary Works shall be inspected weekly and similarly recorded.

All mobile scaffold towers shall be erected in accordance with the manufacturer's instructions and a copy of these shall be submitted to the Project Manager prior to any use on site. Additionally, all towers shall be erected complete with access ladder, safety rails and kick boards whatever the height.

The Contractor shall repair or replace, immediately, any scaffold, including accessories, damaged or weakened from any cause.

The Contractor shall ensure that any slippery conditions on scaffolds are eliminated as soon as possible after they occur.

All scaffolds used for storing materials, for brick or block laying, for access to formwork or for any other purpose where materials may be accidentally fall, shall be provided with wire mesh guards of a substantial material, in addition to kick boards.

Use of Ladders

Manufactured ladders shall meet the applicable safety codes for wood or metal ladders. Metal ladders shall not be used where there is any likelihood of contact with electric cables and equipment. All metal ladders shall be clearly marked: "Caution – Do not use around electrical equipment". Job made ladders shall not be permitted.

Extension or straight ladders shall be equipped with non-skid safety feet, and shall be no more than 12 m in height. The maximum height of a step ladder shall be 2 m. Ladders shall not be used as platforms or scaffold planks.

Ladders rungs and steps shall be kept clean and free of grease and oil.

Extension and straight ladders shall be tied off at the top and/or bottom when in use. Only one person shall be allowed in a ladder at a time.

Defective ladder shall be taken out of service and not used. Ladders shall not be painted and shall be inspected for defects prior to use.

Elevated Work

The Contractor shall provide all personnel, while working at an elevated position, with adequate protection from falls. Details of such protections shall be submitted to the Project Manager.

The Contractor shall carry out daily inspections of all elevated work platforms. Defects shall be corrected prior to use.

705.7.1 Roofing and Sheet Metal Laying

- (a) A Method Statement detailing the procedures to be adopted shall be submitted to and agreed with the Project Manager prior to commencement of work on the site.
- (b) Mobile elevating work platforms or the equivalent shall be used to install roofing and sheet materials wherever practicable and a suitable base is available.

705.7.2 Erection of Structures

- (a) A Method Statement detailing the procedures to be adopted shall be submitted to and agreed with the Project Manager prior to commencement of work on the site.
- (b) Safety harness and lines shall be provided by the Contractor for use by the erection personnel and worn at all times.
- (c) Mobile elevating work platforms or the equivalent shall be used to erect structures wherever practicable and a suitable base is available.

• 705.7.3 Mobile Elevating Work Platforms

Operators shall be trained in the safe use of such platforms and hold a current Certificate of Competence.

□□□ 705.7.4 Hoists

- (a) A copy of the current Test Certificate shall be submitted to the Project Manager before any hoist (personnel or material) is brought into operation on the site. Where the range of travel is increased or reduced a copy of the revised Test Certificate shall be submitted.
- (b) Each landing gate shall be fitted with a mechanical or electrical interlock to prevent movement of the hoist when any such gates is in the open position.
- (c) Safety harness must be worn and used by personnel erecting, altering and dismantling hoists.

• 705.7.5 Suspended Cradles

- (a) Suspended cradles shall be installed, moved and dismantled by a specialist contractor.
- (b) Suspended cradles shall comply with local regulations.
- (c) All powered suspended cradles shall incorporate independent safety lines to overspeed braking devices and independent suspension lines for personal safety harness attachment.

Use of Temporary Equipment

The safe design of any piece of equipment shall not be exceeded, nor shall the equipment be modified in any manner that alters the original factor of safety or capacity. Mobile equipment shall be fitted with suitable alarm and motion sensing devices, including back-up alarm, when required. The Contractor shall ensure that the installation and use of equipment are in accordance with the safety rules and recommendations laid down by the manufacturer, taking into account the other installations already in place or to be installed in the future.

The contractor shall inspect Equipment prior to its use on the Works and periodically thereafter to ensure it is in safe working order. Special attention shall be given to such items as cables, hoses, guards, booms, blocks, hooks and safety devices. Equipment found to be defective shall not be used and immediately removed from services, and a warning tag attached.

Natural and synthetic fibre rope made of material such as manila, nylon, polyester, or polypropylene shall not be used as slings. Only trained, qualified and authorized personnel shall operate equipment. All drivers and operators shall hold a current Certificate of Training Achievement for the equipment being used. A safety observer shall be assigned to watch movements of heavy mobile equipment where hazards may exist to other personnel from the movement of such equipment, or where equipment could hit overhead lines or structures. The observer shall also ensure that people are kept clear of mobile equipment and suspended tools.

When mobile or heavy equipment is travelling onto a public thoroughfare or roadway, a flagman shall ensure that traffic has been stopped prior to such equipment proceeding. While the mobile or heavy equipment is travelling on a public roadway, a trailing escort vehicle with a sign warning of a slow-moving vehicle that is dangerous to pass shall be provided.

Cranes:

- (a) The Contractor shall give a minimum of 48 hours' notice to the Project Manager prior to bringing a crane on site.
- (b) No cranes shall be erected in the site without the prior approval of the Project Manager. The Project Manager may direct the Contractor as to location where cranes may not be located. The Contractor shall take such directions into account when submitting his proposals for crane location points, base footings, pick up points and swing radius. Compliance with any such direction shall not entitle the Contractor to any extension of the Period of Completion or to any increase of the Contract Price.
- (c) Safety harness shall be worn and used at all times by personnel engaged on the erection, alterations and dismantling of tower cranes.
- (d) The Contractor shall provide a copy of the current Test Certificate (see Sub-Clause 702) to the Project Manager before any crane (tower or mobile) is brought into operation on the Site.
- (e) All lifting tackle must hold a current Test Certificate. All lifting tackle must be thoroughly examined every 6 months and an inspection report raised.
- (f) All fibrous/web slings shall be destroyed and replaced 6 months after first use.
- (g) All crane drivers/operators shall hold a Certificate of Training Achievement for the class of crane operated.
- (h) All banksman/slingers shall hold a Training Certificate from a recognized training agency.
- (i) The maximum weekly working hours of a crane driver or banksman shall be restricted to 60 hours.
- (j) Under no circumstances shall a crane or load come within 4 m of any energized overhead power line or other critical structure.

Locking-out, Isolating and Tagging Equipment.

Equipment that could present a hazard to personnel if accidentally activated during the performance of installation, repair, alteration, cleaning, or inspection work shall be made inoperable and free of stored energy and/or material prior to the start of work. Such equipment shall include circuit breakers, compressors, conveyors, elevators, machine tools, pipelines, pumps, valves, and similar equipment.

Where equipment is subject to unexpected external physical movement such as rotating, turning, dropping, falling, rolling, sliding, etc., mechanical and/or structural constraints shall be applied to prevent such movement.

Equipment which has been locked-out, immobilized, or taken out of services for repair or because of a potentially hazardous condition shall be appropriately tagged indicating the reason it has been isolated and/or taken out of service.

Where safety locks are used for locking out or isolating equipment, the lock shall be specially identified and easily recognized as a safety lock.

Installation of Temporary or Permanent Equipment

During installation and testing the Contractor's specialists Project Manager shall be in attendance. All control mechanism panel and wiring diagrams shall be available and printed in English.

Laser Survey Instruments

Details of the types and use of laser instruments shall be submitted and agreed with the Project Manager.

Working in Confined Spaces

Confined spaces, including tanks, vessels, containers, pits, bins, vaults, tunnels, shafts, trenches, ventilations ducts, or other enclosures where known or potential hazards may exist, shall not be entered without prior inspection by and authorization from the Site Safety Officer and the issuance of a Hazardous Work Permit.

Prior to entering the confined space, the area shall be completely isolated to prevent the entry of any hazardous substances or materials which could cause an oxygen deficient atmosphere. All equipment that could become energized or mobilized shall be physically restrained and tagged. All lines going into the confined space shall be isolated and/or blanked.

Personnel working in a confined space where emergency escape or rescue could be difficult, shall wear a safety harness attached to a lifeline. A qualified attendant(s), trained and knowledgeable in job-related emergency procedures, shall be present at all times while persons are working within the confined space. The attendant shall be capable of effecting a rescue, have necessary rescue equipment immediately available, and be equipped with at least the same protective equipments as the person making entry.

All equipment to be used in a confined space shall be inspected to determine its acceptability for use. Where a hazard from electricity may exist, equipment utilized shall be of low voltage type. The atmosphere within the confined space shall be tested to determine if it is safe to enter. Acceptable limits are:

- oxygen: 19.5% lower, 22% higher;
- flammable gas: not to exceed 10% of lower explosion limit;
- toxic contaminants: not to exceed the permissible exposure limit.

Subsequent testing shall be done after each interruption and before re-entering the confined space, as well as at intervals not exceeding 4 hours. Continuous monitoring is preferable and may be necessary in certain situations.

Adequate ventilation shall be provided to ensure the atmosphere is maintained within acceptable limits.

Demolition

A detailed Method Statement detailing the demolition procedures/techniques to be used shall be submitted to and approved by the Project Manager prior to commencement of work on site.

The Method Statement must include full details of measures to be taken to ensure that there are no persons remaining in the building/structure and to distance members of the public and Contractor's personnel from the building/structure prior to demolition.

Use of Explosives

The Contractor shall not use explosives without the written permission from the Project Manager and relevant authorities.

The Contractor shall observe all regulations regarding proper purchasing, transportation, storage, handling and use of explosives.

The Contractor shall ensure that explosives and detonators are stored in separate special building. These secured buildings shall be constructed, located and clearly marked in English:

(xiv) "DANGER – EXPLOSIVES"

all as approved by the Project Manager and relevant authorities. The Contractor shall ensure that all possible precautions are taken against accidental fire or explosion, and ensure that explosives and detonators are kept in a proper and safe condition. The contractor shall ensure that explosives and detonators are always transported in separate vehicles and kept apart until the last possible moment and that metallic tools are not used to open boxes of explosives or detonators.

Blasting Procedure: the contractor shall carry out blasting operations in a manner that will not endanger the safety of persons or property. The Contractor shall, along with other necessary precautions:

- (a) clear all persons from building and the area affected by the blasting. All such persons shall be given adequate notice of the actual time and date of blasting;
- (b) ensure that police and other local authorities are kept fully informed, in advance, of the blasting programme so that they may be present when blasting takes place if they so require;
- (c) erect warning notices around the area affected that blasting operation are in progress;
- (d) carry out a thorough search of buildings and the area affected prior to blasting;
- (e) ensure that blasting is only carried out by experienced shot firers. Priming, charging, stemming and shot firing shall be carried out with greatest regard for safety and in strict

accordance with the rules and regulations of the relevant authorities.

- (f) ensure that explosive charges are not excessive, charged boreholes are properly protected and proper precautions are taken for the safety of persons and property.

The Contractor shall maintain an up-to-date inventory of all explosives and explosive devices and shall submit a monthly report to the Project Manager, detailing the use of all explosives by date and location.

Excavation and Trenching

An excavation permit signed by the Project Manager must be issued before excavation proceeds in any work location. The contractor shall investigate and identify the location of existing services by study of the drawings, a visual/physical study of the site, sweeping by appropriate detection equipment and where necessary hand excavation of trial holes.

Following this investigation, the Contractor shall submit a written request for an excavation permit to the Project Manager.

The Project Manager will return the permit signed and dated to indicate:

- services which are to be maintained.
- services which are to be isolated.
- any special precautions to be taken.

A sample Excavation Permit is given in Annex 1 to this Specification. The issue of an Excavation Permit by the Project Manager shall not relieve the Contractor of his responsibilities under the Contract.

The side of all excavations and trenches which in the opinion of the Project Manager might expose personnel or facilities to danger resulting from shifting earths shall be protected by adequate temporary supports or sloped to the appropriate angle of repose.

All excavations, slopes and temporary supports shall be inspected daily and after each rain, before allowing personnel to enter the excavation.

Excavations 1.3 metres or more in depth and occupied by personnel shall be provided with ladders as a means for entrance and egress. Ladders shall extend not less than 1 metre above the top of the excavation.

The Contractor shall provide adequate barrier protection to all excavations. Barriers shall be readily visible by day of night.

Excavated or other materials shall be stored at least 0.65 metres from the sides of excavations.

Concrete Reinforcement Starter Bars

The Contractor shall ensure concrete reinforcement starter bars are not a danger to personnel. Where permitted by the Project Manager, starter bars shall be bent down. Alternatively, the starter bars shall be protected using either hooked starters, plastic caps, plywood covers or other methods agreed with the Project Manager.

706 Environmental and Health Requirements

Contractor environmental and social management plan

The Contractor shall develop his own Environmental and Social Management Plan to ensure actions and mitigation necessary to protect the environment as contained in the Project ESIA Report and License, are incorporated into all site procedures. At a minimum, the contractor's ESMP must address the following:

- Policy
- Planning
- Implementation and Operation

706.1.1 Policy

The Contractor shall develop an environmental policy that includes, as a minimum, the following:

- A commitment to comply with applicable regulations and other requirements that the construction company subscribes to;
- A commitment to provide a safe work environment;
- A commitment to provide the training and equipment necessary for employees to conduct their work safely;
- A commitment to continuously improve performance and to pollution prevention; and
- A commitment to communicate the policy to all persons working for and on behalf of the company.

706.1.2 Planning

Environmental issues and the legal and other requirements in construction of the project have been identified in the project's ESIA Report. The Contractor must demonstrate within his plan that he has read and understood the ESIA Report and its provisions for environmental management and monitoring.

706.1.3 Implementation and Operation

Roles, responsibilities and authorities must be defined, documented and communicated to ensure effective environmental and social management. A specific management representative with requisite qualifications shall be assigned the responsibility for ensuring that the ESMP is established, implemented and maintained and shall be responsible for reporting performance, reviewing the Plan and making recommendations for improvement. Documented confirmation is required that the training needs of all persons working for or on the company's behalf whose work pose significant hazards to their health and safety and/or may create a significant impact on the environment has been identified. Records of all training must be maintained.

Management, supervisory, and employee responsibilities must be communicated to all employees through training, formal job descriptions, work experience, hiring practices, etc. Awareness training shall be provided that include the importance of conforming to the policy and procedures, the significant environmental issues, and the roles and responsibilities of management and staff.

Records shall be legible, identifiable and traceable to the activity. Records shall be stored and maintained in such a way that they are retrievable and protected against damage, deterioration or loss.

The Contractor shall establish, implement and maintain procedures to identify potential emergency situations and potential accidents that can have an impact on the environment, surrounding communities, the employees, and/or the public.

The Contractor shall be prepared to respond to actual emergency situations and accidents and prevent or mitigate associated adverse environmental or social impacts. The ESMP must also address how the Contractor will receive, document and respond to external interested parties.

706.2 Protection of the Environment

The Contractor shall be knowledgeable of and comply with the Environmental Management Plan (EMP) and with all environmental laws, rules and regulations for materials, including hazardous substances or wastes under his control. The contractor shall not dump, release or otherwise discharge or dispose of any such materials without the authorization of the Project Manager.

Any release of a hazardous substance to the environment, whether air, water or ground, must be reported to the Project Manager immediately. When releases resulting from Contractor action occur, the Contractor shall take proper precautionary measures to counter any known environmental or health hazards associated with such release. These would include remedial procedures such as spill control and containment and notification of the proper authorities.

706.3 Air Pollution

The Contractor, depending on the type and quantity of materials being used, may be required to have an emergency episode plan for any releases to the atmosphere. The Contractor shall also be aware of local ordinances affecting air pollution.

The Contractor shall take all necessary measures to limit pollution from dust and any windblown materials during the Works, including damping down with water on a regular basis during dry climatic conditions.

The contractor shall ensure that all trucks leaving the Site are properly covered to prevent discharge of dust, rocks, sand, etc.

706.3 Water Pollution

The contractor shall not dispose of waste solvents, petroleum products, toxic chemicals or solutions on the city drainage system or watercourse, and shall not dump or bury garbage on the Site. These types of waste shall be taken to an approved disposal facility regularly, and in accordance with requirements of relevant Authorities. The Contractor shall also be responsible for the control of all run-offs, erosion, etc.

706.4 Solid Waste

706.4.1 General Housekeeping

- (a) The Contractor shall maintain the site and any ancillary areas used and occupied for performance of the Works in a clean, tidy and rubbish-free condition at all times.
- (b) Upon the issue of any Taking-Over Certificate, the Contractor shall clear away and remove from the Works and the Site to which the Taking-Over Certificate relates, all Contractor's Equipment, surplus material, rubbish and Temporary Works of every kind, and leave the said Works and Site in a clean condition to the satisfaction of the Project

Manager. Provided that the Contractor shall be entitled to retain on Site, until the end of the Defects Liability Period, such materials, Contractor's Equipment and Temporary Works as are required by him for the purpose of fulfilling his obligations during the Defects Notification Period.

706.4.2 Rubbish Removal and Disposal

- (a) The Contractor shall comply with statutory and municipal regulations and requirements for the disposal of rubbish and waste.
- (b) The Contractor shall provide suitable metal containers for the temporary storage of waste.
- (c) The Contractor shall provide suitable metal containers from site as soon as they are full. Rubbish containers shall not be allowed to overflow.
- (d) The Contractor shall provide hard standings for and clear vehicle access to rubbish containers.
- (e) The Contractor shall provide enclosed chutes of wood or metal where materials are dropped more than 7 meters. The area onto which the material is dropped shall be provided with suitable enclosed protection barriers and warning signs of the hazard of falling materials. Waste materials shall not be removed from the lower area until handling of materials above has ceased.
- (f) Domestic and biodegradable waste from offices, canteens and welfare facilities shall be removed daily from the site.
- (g) Toxic and hazardous waste shall be collected separately and be disposed of in accordance with current regulations.

706.4.3 Asbestos Handling and Removal

The Contractor shall comply with all local regulations regarding the handling of asbestos materials. In the absences of local regulations, relevant International Standards shall apply.

706.4.4 Pest Control

The Contractor shall be responsible for the rodent and pest control on the Site. If requested, the contractor shall submit to the Project Manager, for approval, a detailed programme of the measures to be taken for the control and eradication of rodents and pests.

706.5 Noise Control

The Contractor shall ensure that the works is conducted in a manner so as to comply with all restrictions of the Authorities having jurisdiction, as they relate to noise.

The Contractor shall, in all cases, adopt the best available plant/and or machinery shall be used. All equipment shall be maintained in good mechanical order and fitted with the appropriate silencers,

mufflers or acoustic covers where applicable. Stationary noise sources shall be sited as far away as possible from noise-sensitive areas and, where necessary, acoustic barriers shall be used to shield them. Such barriers may be proprietary types, or may consist of site materials such as bricks or earth mounds as appropriate.

Compressors, percussion tools and vehicles shall be fitted with effective silencers of a type recommended by the manufacturers of the equipment. Pneumatic drills and other noisy appliances shall not be used during days of rest or after normal working hours without the consent of the Project Manager.

Areas where noise levels exceed 90 decibels, even on a temporary basis, shall be posted as high noise level areas.

707 Additional Requirements for Work in Public Areas

General

Those additional requirements shall apply to all works carried out in Public Areas.

Public Areas are defined as areas still used by or accessible to the public. These include public roads and pavements, occupied buildings and areas outside the Contractor's boundary fencing.

All work in Public Areas shall be carried out to minimize disturbance and avoid dangers to the public.

Before commencing work, the Contractor shall ensure that all necessary resources, including labour, plant and materials will be available when required and that the works will proceed without delays and be completed in the shortest possible time. Period of inactivity and slow progress or delays in meeting the agreed programme for the Works, resulting from the Contractor's failure to provide necessary resources or other causes within the control of the Contractor, will not be accepted. In the event of such inactivity, slow progress or delays, the Contractor shall take immediate action to rectify the situation, including all possible acceleration measures to complete the works within the agreed programme. Details of the actions and acceleration measures shall be submitted to the Project Manager. If the Project Manager is dissatisfied with the Contractor's proposals, the Contractor shall take such further actions or measures as required by the Project Manager. All costs incurred shall be the responsibility of the Contractor.

Method Statement

The Contractor shall submit to the Project Manager a method statement for each separate area or work in Public Areas. The Method Statement shall include:

- (a) a general description of the Works and methodology of how it will be carried out.
- (b) Details of the measures and temporary works to minimise disturbance and safeguard the public. These shall include temporary diversions, safety barriers, screens, signs, lighting, watchmen and arrangements for control of traffic and pedestrians and advance warning to be given to the public.
- (c) Details of temporary reinstatement and maintenance of same prior to final reinstatement.
- (d) For works involving long lengths of trenches or works to be completed in sections,

the lengths or sections of each activity (e.g. up to temporary reinstatement, final reinstatement) to be carried out at any one time.

- (e) Details of the availability of necessary resources (labour, plant, materials, etc.) to complete the work.
- (f) A programme showing start and completion dates and period for all activities of each length or section, including temporary works, and the works overall.
- (g) Such further information as necessary or required by the Project Manager.

The Contractor shall not commence work, including temporary works, until after the approval of the Contractor's Method Statement by the Project Manager.

Method Statements shall be updated bases on actual progress or as and when required by the Project Manager.

Closure of Roads, Etc.

The closure or partial closure of roads, pavements and other public areas will only be permitted if approved by the Project Manager and Relevant Authorities. The Contractor shall detail for each closure the extent of area to be closed, the reasons and duration of the closure, and where appropriate, proposed diversions. A sample Street Closure Permit is given at Annex 2 to this Specification.

Trench and Other Excavations

The requirements covering trench and other excavations will depend on the location and type of the excavation and the potential risks to the public.

The following guidelines apply particularly to trenches but shall also apply to other types of excavations:

- (a) before commencing work the Contractor shall:
 - notify the Project Manager of the location and duration of the work. An excavation permit signed by the Project Manager must be issued in accordance with Sub-Clause 705.16 before excavation proceeds in any work location;
 - obtain permission from relevant authorities including the police when required;
 - erect all temporary works such as barriers, warning signs, lighting, etc.;
 - have available adequate materials for temporary supports to sides of excavations and necessary labour, plant and materials to complete the work within the shortest possible time.
- (b) in carrying out the works the Contractor shall, unless otherwise permitted or required by the Project Manager:
 - not open more than one excavation within a radius of 250 metres;
 - limit the length of trench excavation open at one time to 150 metres;
 - maintain and alter or adapt all temporary works including supports to sides of excavations;
 - remove all surplus excavated material the same day it is excavated;
 - complete the works, including final reinstatement within ten days;
 - where final reinstatement is not achieved within the required time, to carry out temporary reinstatement;

- ensure that any temporary reinstatement is maintained at the correct level until final reinstatement is achieved.

The above guidelines shall not relieve the Contractor of his obligations and responsibilities.

Safety Barriers

Safety barriers shall be provided to the perimeter of work areas and to trench and other types of excavations and to existing openings such as manholes, draw pits and the like. When exposed to the public, safety barriers shall be provided to both sides and ends of trenches and around all sides of openings.

The Contractor shall provide details of the type or types of safety barriers for each excavation for the approval of the Project Manager prior to commencing work. No work shall commence until the safety barriers are in place.

The type of safety barrier used shall be appropriate to the particular location and the potential risks to the public. Examples of different types of safety barriers are given below:

- Type 1 - excavated material;
- Type 2 - non-rigid barrier of rope or florescent tape strung between metal rods driven into the ground;
- Type 3 - rigid barrier of timber, steel or concrete. Such barriers could be in the form of horizontal rail(s) or sheet material secured to posts driven or concreted onto the ground.

The following are guidelines on the type of safety barriers that could be used in differing situations. They apply particularly to trenches but also apply to other types of excavation, existing openings onto the perimeter of work areas:

- areas not subject to vehicular traffic - Types 1 or 2;
- roadways (low traffic speed) - Types 1 or 2;
- roadways (high traffic speed or where excavation are greater than 2 m) - Type 3.

The above examples of the types of barriers and the guidelines on situations in which they could be used shall not relieve the Contractor of his obligations and responsibilities.

SECTION 8 CONTRACTOR'S SITE CHECK LIST

801 Contractor's Site Check List

A sample Contractor's Site Check List is included in Annex 1,2 & 3 to this Specification. This is included to assist contractors should they wish to introduce such a system as part of their site management procedures. The list is not exhaustive and further items will need to be added by the Contractor.

The list is issued for guidance only, and does not, in any way, revise or limit the requirements covered elsewhere in these Specifications.

(xv) Annex 1

Sample Excavation Permit

To: (Project Manager)

From: (Contractor)

Date:

(xvi) Contract No:

Request for Excavation Permit No:

Please give approval for excavation to proceed in the following area: Work to start on:

Existing services have been checked and identified by:

Drawings	#	Physical Survey	#
Catscan	#	Trial Holes Excavation	#

Signed (Contractor):

(xvii) Approval by Project Manager

The above excavation may proceed, subject to the following:

Service to be maintained:

Services to be isolated before work proceeds:

Other matters:

Signed (Project Manager):

Date:

(xviii) Annex 2

Sample Street Closure Permit

To: (Project Manager)

From: (Contractor)

Date:

(xix) Contract No:

Request for Street Closure Permit No:

Please give approval for the closure of the following street(s) from to (dates)

Street(s):

Reasons:

Proposed diversions:

Signed (Contractor):

(xx) Approval of the Project Manager

The above street(s) may be closed for the periods stated subject to the following conditions:

Approval has been given by the relevant authorities and the police;

Other:

Signed (Project Manager):

Date:

(xxi) Annex 3

Sample Contractor's Site Check

List Safe Access:

- arrangements for visitors and new workers to the site
- safe access to working locations
- walkways free from obstructions
- edge protection to walkways over 2m above ground
- holes fenced or protected with fixed covers
- tidy site and safe storage of materials
- waste collection and disposal
- chutes for waste disposal, where applicable
- removal or hammering down of nails in timber
- safe lighting for dark or poor light conditions
- props or shores in place to secure structures, where applicable

(xxii) Ladders:

- to be used only if appropriate
- good condition and properly positioned
- located on firm, level ground
- secure near top. If not possible, to be secured near bottom, weighted or footed to prevent slipping
- top of ladder minimum 1 metre above landing place

(xxiii) Scaffolding:

- design calculation submitted
- proper access to scaffold platform
- properly founded uprights with base plates
- secured to the building with strong ties to prevent collapse
- braced for stability
- load bearing fittings, where required
- uprights, ledgers, braces and struts not to be removed during use
- fully boarded working platforms, free from defects and arranged to avoid tipping or tripping
- securely fixed boards against strong winds
- adequate guard rails and toe boards where scaffold is 2m above ground
- designed for loading with materials, where appropriate
- evenly distributed materials
- barriers or warning notices for incomplete scaffold (i.e. not fully boarded)
- weekly inspections and after bad weather by competent person
- record of inspections

(xxiv) Excavation:

- underground services to be located and marked, precautions taken to avoid them
- adequate and suitable timber, trench sheets, props and other supporting materials available on site before excavation starts
- safe method for erecting and removal of timber supports
- sloped or battered sides to prevent collapse
- daily inspections after use of explosives or after unexpected falls of materials
- safe access to excavations (e.g. sufficiently long ladder)
- barriers to restrict personnel/plant
- stability of neighbouring buildings
- risk of flooding
- materials stacked, spoil and vehicles away from top of excavations to avoid collapse

-
- secured stop blocks for vehicles tipping into excavations

(xxv) Roof Work:

- crawling ladders or boards on roofs more than 10 degrees
- if applicable, roof battens to provide a safe handhold and foothold

- barriers or other edge protection
- crawling boards for working on fragile roof materials such as asbestos cement sheets or glass. guard rails and notices to same
- roof lights properly covered or provided with barriers
- during sheeting operations, precautions to stop people falling from edge of sheet
- precautions to stop debris falling onto others working under the roof work

(xxvi) Transport and Mobile Plant:

- in good repair (e.g. steering, handbrake, footbrake)
- trained drivers and operators and safe use of plant
- secured loads on vehicles
- passengers prohibited from riding in dangerous positions
- propping raised bodies for tipping lorries prior to inspections
- control of on-site movements to avoid danger to pedestrians, etc.
- control of reversing vehicles by properly trained banksmen, following safe system of work

(xxvii) Machinery and Equipment:

- adequate secured guards in good repair to dangerous parts, e.g. exposed gears, chain drives, projecting engine shafts

(xxviii) Cranes and Lifting Appliances:

- weekly recorded inspections
- regular inspections by a competent person
- test certificates
- competent and trained drivers over 18 years of age
- clearly marked controls
- checks by driver and banksman on weight of load before lifting
- efficient automatic safe load indicator, inspected weekly, for jib cranes with a capacity of more than one tonne
- firm level base for cranes
- sufficient space for safe operation
- trained banksman/slinger to give signals and to attach loads correctly, with knowledge of lifting limitation of crane
- for cranes with varying operating radius, clearly marked safe working loads and corresponding radii
- regular maintenance
- lifting gear in good condition and regularly examined

(xxix) Electricity:

- measures to protect portable electric tools and equipment from mechanical damage and wet conditions
- checks for damage to or interference with equipment, wires and cables
- use of correct plugs to connect to power points
- proper connections to plugs; firm cable grips to prevent earth wire from pulling out “permit-to-work” procedures, to ensure safety
- disconnection of supplies to overhead lines or other precautions where cranes, tipper lorries, scaffolding, etc. might touch lines or cause arcing

(xxx) Cartridge Operated Tools:

- maker’s instruction being followed
- properly trained operators, awareness of dangers and ability to deal with misfires
- safety goggles

-
- regular cleaning of gun
 - secure place for gun and cartridges when not in use

(xxxi) Falsework/formwork:

- design calculations submitted method statement dealing with preventing falls of workers
- appointment of falsework coordinator

- checks on design and the supports for shuttering and formwork
- safe erection from steps or proper platforms
- adequate bases and ground conditions for loads
- plumb props on level bases and properly set out
- correct pins used in the props
- timberwork in good condition
- inspection by competent person, against agreed design, before pouring concrete

(xxxii) Risks to the Public:

- identify all risks to members of the public on and off site, e.g. materials falling from scaffold etc., site plant and transport (access/egress) and implement precautions, e.g. scaffold fans/nets, banksmen, warning notices, etc.
- barriers to protect/isolate persons and vehicles
- adequate site perimeter fencing to keep out the public and particularly children. secure the site during non-working periods
- make safe specific dangers in site during non-working periods, e.g. excavations and openings covered or fenced, materials safely stacked, plant immobilized, ladders removed or boarded

(xxxiii) Fire – General:

- sufficient number and types of fire extinguishers
- adequate escape routes, kept clear
- worker awareness of what to do in an emergency

(xxxiv) Fire – Flammable Liquids:

- proper storage area
- amount of flammable liquid on site kept to a minimum for the day's work
- smoking prohibited; other ignition sources kept away from flammable liquids
- proper safety containers

(xxxv) Fire – Compressed Gases, e.g. Oxygen, LPG, Acetylene:

- properly stored cylinders
- valves fully closed on cylinders when not in use
- adopt “hot work” procedures
- site cylinders in use outside huts

(xxxvi) Fire – Other Combustible Materials:

- minimum amount kept on site
- proper waste bins
- regular removal of waste material

(xxxvii) Noise:

- assessment of noise risks
- noisy plant and machinery fitted with silencers/muffs
- ear protection for workers if they work in very noisy surroundings

(xxxviii) Health:

- identify hazardous substances, e.g. asbestos, lead, solvents, etc., and assess the risks
- use of other substances where possible
- control exposure by means other than by using protective equipment
- safety information sheets available from the supplier
- safety equipment and instructions for use
- keep other workers who are not protected out of danger areas

-
- testing of atmosphere in confined spaces; provision of fresh air supply if necessary. Emergency procedures for rescue from confined spaces

(xxxix) Manual Handling:

- avoid where risk of injury
- if unavoidable, assess and reduce risks

(xl) Protective Clothing:

- suitable equipment to protect head, eyes, hands and feet where appropriate

- enforce wearing of protective equipment
- (xli) Welfare:
- suitable toilets
 - clean wash basin, hot/warm water, soap and towel
 - room or area where clothes can be dried
 - wet weather gear for those working in wet conditions
 - heated site hut where workers can take shelter and have meals with the facility for boiling water
 - suitable first aid facilities
- (xlii) Work in Public Areas:
- all risks to the public identified
 - method statement approved
 - road closures approved
 - temporary diversions in place
 - safety barriers erected/maintained
 - labour, materials, plant and other resources sufficient to meet programme
 - temporary reinstatement completed and properly maintained
 - permanent reinstatement completed at earliest possible date.

802 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) is a practical and achievable plan of management to ensure that any environmental impact during the design, planning and construction phase are minimised. CEMP's have been proposed to deal with the following issues during Project construction:

Compensation and land take
Physical setting, flora and fauna;
Interruption of key infrastructure installations;
Water quality and energy management;
Dust and air quality;
Occupational health and safety;
Noise and vibration; and
Waste management.

Detailed CEMP's are presented below.

CEMP for Compensation and land take

Objective	To ensure that the land owners are properly compensated and avail land for the proposed Project.			
Management strategy	Since compensation is an integral part of Project design ensure it is dealt with from the earliest stages of Project preparation and comply with the laws of Kenya.			
	Activities	Responsibility	Timing	Costs (KES)
Actions	Land take should be minimized where feasible, exploring all viable alternative Project designs e.g. realignment of the pipeline may significantly reduce compensation; and Where displacement is unavoidable, compensation and resettlement plans should be developed with adequate compensation under guidance of various lead agencies including Ministry of Lands, TWSB, Local Councils and the	Proponent	Prior to construction	TBD
Performance indicators	Lack of complaints / Complaints.	Proponent	Construction Phase	
Monitoring requirements	Documentation; and Land easement	Proponent	Construction Phase	
Reporting	Documentation	Proponent	Construction Phase	
Corrective actions	Implement recommendations.	Proponent	Construction Phase	
Interface	Ensure compliance with the Law of Kenya and the requirements of any donors involved in the Project.	Proponent	Construction Phase	

CEMP for Physical setting, flora and fauna

Objective	Maintain the existing balance within the physical, fauna and flora components in the Project area setting.			
Management strategy	Provide for appropriate measures that guarantee the protection of habitats, flora and fauna.			
	Activities	Responsibility	Timing	Costs (KES)
Actions	Provide structures that will not hinder free movement of animals and dispersal of propagation components; Maintain as much as possible the natural drainage systems and patterns; Grade sites to original levels to maintain topography; As much as practical limit the amount of vegetation cleared during works; Discourage bush meat hunting; In the event that considerable damage to vegetation is envisaged, set out a plan for replacement or grading to encourage natural rejuvenation; and Design and plan for use of wayleave by pedestrians and non-motorised	Consulting Engineers Contractor AWSB	Planning, Design & construction	TBD
Performance indicators	Presence of a good balance of flora and fauna; and Minimal or no flooding in Project area.	AWSB	Construction Phase	
Monitoring requirements	Baseline data/Project completion Baseline; and Changes in local hydrology.	AWSB	Commissioning stage.	
Reporting	Site log book and EMCA requirements.	Contractor	Construction Phase	
Corrective actions	Rehabilitation	AWSB	Commissioning stage	
Interface	EMP complies with the EMCA and other applicable laws.	AWSB	Construction	

CEMP for management of infrastructure installations

Objective	Plan construction activities to minimise interruptions of infrastructure and ensure smooth Project implementation while complying with the laws of Kenya			
Management strategy	Liaise with stakeholders in the project area to ensure that access on protected or private areas is granted in good time in order to achieve Project milestones.			
	Activities	Responsibility	Timing	Costs (KES)
Actions	Establish the nature of all stakeholders; Identify key interests of each of the stakeholders; Formally liaise with the stakeholder and communicate the Project details to them with a view of developing a work plan; Implement work plan; and Acquire notes on Satisfactory Completion of Works by each affected party.	AWSB Consultant Contractors	Planning, Design and Construction phase	TBD
Performance indicators	Level of complains.	All	Construction phase	
Monitoring requirements	Timely achievement of milestones; and Lack of interruption of services.	All	Construction	
Reporting	Site log book	Contractor	Construction phase	
Corrective actions	Investigate cause of interruptions; Implement corrective measures.	AWSB Stakeholders	Construction phase	
Interface	Comply with the EMP contained in this report.	Contractor	Construction phase	

CEMP for water and energy management

Objective	Minimise impact on water and energy resources within the Project area due to the construction works.			
Management strategy	Conserve water and energy resources, abate pollution and comply with the laws of Kenya.			
	Activities	Responsibility	Timing	Costs (KES)
Actions	Provide appropriate and adequate drainage infrastructure where required; Ensure machinery is regularly serviced to avoid leakages and/or spillages; Oils, fuels and other materials to be stored in accordance with the manufacturers' safety data sheets (MSDS); Train staff on spill response; Implement erosion and sedimentation controls; Proper handling/disposal of liquid waste; Energy management through use of sound/appropriate equipment; Application of rated equipment in welding and related works; and	Contractor	Construction phase	TBD
Performance indicators	Minimal interference of water and energy resource in the area.	Contractor	Construction phase	
Monitoring requirements	Physical inspection; and Level of complains.	Consultant	Construction phase	
Reporting	Site activities log book.	Contractor	Construction phase	
Corrective actions	Implementation of monitoring findings and recommendations.	Contractor	Construction phase	
Interface	Comply with laws and guidelines.	Contractor	Construction phase	

CEMP for dust and air quality

Objective	Maintain the quality of the air and minimise any harmful emissions into the atmosphere and comply with the laws of Kenya			
Management strategy	Abate pollution of the atmosphere by airborne particulate matter.			
	Activities	Responsibility	Timing	Costs (KES)
Actions	Dampen work areas materials heaps and mulch bare ground to minimise dust emissions; Maintain equipment and machinery to manufacturers' specifications; Use environmentally friendly fuels; Minimise the period for machinery idling; Pursue good practices in energy use and sensitise staff; and Provide appropriate personal protective equipment to site workers.	Contractor	Construction phase	TBD
Performance indicators	Lack of complaints / Complaints; and Reports / Log book entries.	AWSB	Construction phase	
Monitoring requirements	Physical inspection Site Log books	Consultant	Construction phase	
Reporting	Site logs of inspections and corrective actions.	Contractor	Construction phase	
Corrective actions	Implement recommendations	Contractor	Construction phase	
Interface	Review and comply with laws and regulations.	Contractor	Construction phase	

CEMP for occupational health and safety

Objective	Ensure the safety and health of all the Parties involved in the Project implementation and comply with the laws of Kenya			
Management strategy	Provide proper safety equipments, facilities and conditions that will eliminate or reduce the risk to the Project workers and all those present therein.			
	Activities	Responsibility	Timing	Costs (KES)
Actions	Comply to the OSHA; Provide for appropriate signage and warnings at work sites; Provide appropriate personnel protective equipment (PPE) to workers and any visitors; Provide for First Aid facilities as per the Occupational Safety and Health Act; Provide and clearly display emergency contacts; and Develop and implement a detailed and site specific Emergency Response Plan.	AWSB Consulting Engineers Contractor	Construction phase	TBD
Performance indicators	Health and safety awareness among staff; and Frequency of incidents/accidents and fatalities.	Consultant AWSB	Construction phase	
Monitoring requirements	Daily inspection of work sites; and Tool box meetings.	Consultant	Construction phase	
Reporting	Log incidents/accidents and fatalities; and Tool box minutes.	Consultant	Construction phase	
Corrective actions	Investigate incident/accidents and fatalities; and Follow up on complains and other issues from tool box meetings.	Consultant	Construction phase	
Interface	Updates on the OSHA and orders from Directorate	AWSB	Construction phase	

CEMP for noise and vibration management

Objective	Manage activities at construction sites to reduce impacts of noise on surrounding properties and comply with the laws of Kenya.			
Management strategy	Noise to be managed through administrative and maintenance controls during construction.			
	Activities	Responsibility	Timing	Costs (KES)
Actions	All construction activities to be limited to between 7am to 6pm; All equipment used during the construction phase to be regularly maintained to ensure efficient operation; Noise dampening materials to be used where excessive noise generating-equipment are in use; Use of appropriate cushioning for heavy equipment; and	Contractor	Construction phase	TBD
Performance indicators	Lack of complaints / Complaints.	Contractor	Construction phase	
Monitoring requirements	Periodic inspection of work sites; and Service log for equipment / machinery.	Contractor	Construction phase	
Reporting	Complaints / incidents should be recorded in a log book on location.	Consultant	Construction phase	
Corrective actions	Investigate cause of noise and vibrations; Implement corrective measures prior to commencement of works; and Consider possibility of rescheduling noise and vibration generating activities.	Contractor AWSB	Construction phase	
Interface	Ensure that if the Contractors or subcontractors have an EMP and that it complies with the EMP contained in this report.	AWSB	Construction phase	

CEMP for waste management

Objective	Minimise the potential for environmental impact of wastes generated due to the construction activities and comply with the laws of Kenya.			
Management strategy	Effectively manage the sites and activities that may lead to generation of wastes.			
	Activities	Responsibility	Timing	Costs (KES)
Actions	All wastes shall be contained on site prior to disposal using appropriate storage containers; All wastes shall be regularly cleared from the site and disposed of in approved manner; High level of housekeeping shall be maintained; and Staff shall be trained / sensitised about waste management at the start of the Project and regularly as may be found appropriate.	Contractor	Construction phase	TBD
Performance indicators	No waste at work sites except in approved and marked locations.	Contractor	Construction phase	
Monitoring requirements	Regular site inspections; and Waste disposal documentation and tracking.	Contractor	Construction phase	
Reporting	Review of waste handling slips and other related documentation.	Contractor	Construction phase	
Corrective actions	Provide reports, corrective actions and recommendations where non-conformities occur.	Contractor	Construction phase	
Interface	Ensure that Contractors or subcontractors EMP complies with the EMP contained in this report.	Contractor	Construction phase	

Abbreviations

The following abbreviations are used in these documents:

FIDIC	Federation International des Ingenieurs – Conseils
BS	British Standards
CP	Code of Practice
GRP	Glass Reinforced Plastic
AC	Asbestos Cement
DI	Ductile Iron
Ch	Chainage
PVC	Polyvinyl Chloride
kPa	kilo Pascal
g	acceleration due to gravity - (9.807m/s ²)
gpm	gallons per minute
mgd	million gallons per day
mm	millimeters
m	metres
mhd	metres head
m ³	cubic metres
m ³ /day	cubic metres per day
m/s ²	metres per second head
l/head/day	litres
per head per day	kW
ts	kilowatt
kVa	kilovolt-ampere
kWh	kilowatt hour
ISO	International Standards Organisation
CFM	cubic feet per minute
AOD	Above ordnance datum
SWL	Static water level
PWL	Pumping water level
GL	Ground level
EOH	End of hole

1. List of Goods and Related Services

Description of Goods	Quantity	Physical unit	Final (Project Site) Destination as specified in BDS	Delivery (as per Incoterms) Date		
				Earliest Delivery Date	Latest Delivery Date	Bidder's offered Delivery date [<i>to be provided by the bidder</i>]

2. Delivery and Completion Schedule

The required date of arrival on the Project Site is no later than: 180 days after contract signature.

The required completion date is no later than: 180 days after contract signature

Environmental and Social Requirements

Sub-Clause /Clause No.	Sub-Clause/Clause	Remarks
8.2	<i>Other Contractors</i>	<i>Indicate specific aspects (if any) that require contractor's cooperation such as to conduct environmental and social assessment.</i>
9.4.1, 9.4.2, 9.4.7, 9.4.8	<i>labor</i>	<i>State applicable requirements in accordance with the labor management procedure.</i>
9.4.6	<i>Facilities for Staff and Labor</i>	<i>-Indicate if access to or provision of services that accommodate physical, social and cultural needs of Contractor's Personnel is required.</i>
9.4.20	<i>Training of Contractor's Personnel</i>	<i>As set out in the ESCP, specify details of any training to relevant Contractor's Personnel to be provided by the Employer's Personnel on environmental and social aspects. (whom, what, when, where, how long etc.)</i>
15.2	<i>Contractor to Construct the Works</i>	<p><i>If the Contract specifies that the Contractor shall design any part of the Permanent Works, state any applicable technical standards and requirements including to address:</i></p> <ul style="list-style-type: none"> • <i>climate change considerations,</i> • <i>universal access,</i> • <i>risks of the public's potential exposure to operational accidents or natural hazards, including extreme weather events, applicable certification or approval requirements</i> <p><i>[Refer to ESS4 on requirements for design]</i></p>
18.2	<i>Health and Safety Obligations</i>	<i>Indicate any additional requirements for the health and safety manual</i>

Sub-Clause /Clause No.	Sub-Clause/Clause	Remarks
18.3	Protection of the Environment	Specify any values for emissions, surface discharges, effluent and any other pollutants from the Contractor's activities that shall not be exceeded.
19.1	Archeological and Geological Findings	Specify other requirements if any in accordance with the ESF – ESS8
29.1	Security of the Site	State any additional requirements for the security arrangements (ESS4 of the ESF states the principles of proportionality, GIIP and applicable laws.) Include any other requirement set out in the ESCP.

Management and Safety of Hazardous Materials

As applicable, specify requirements for the management and safety of hazardous materials (see ESF - ESS4 para. 17 and 18 and relevant guidance notes).

Resource Efficiency and Pollution Prevention and Management

As applicable specify Resource Efficiency and Pollution Prevention and Management measures (see ESF -ESS3 and relevant guidance notes).

- **Resource efficiency**

The Employer shall specify, as applicable, measures for improving efficient consumption of energy, water and raw materials, as well as other resources.

- **Energy:** When the Works have been assessed to involve a potentially significant use of energy, specify any applicable measures to optimize energy usage.
- **Water:** When the Works have been assessed to involve a potentially significant use of water or will have potentially significant impacts on water quality, specify any applicable measures that avoid or minimize water usage so that the Works' water use does not have significant adverse impacts on communities, other users and the environment.
- **Raw material:** When the Works have been assessed to involve a potentially significant use of raw materials, specify any applicable measures to support efficient use of raw materials.

- **Pollution prevention and management**

- **Management of air pollution:** specify any measure to avoid or minimize Works related air pollution. See also GCC Sub-Clause 18.3 and the table above on Conditions of Contract that make reference to ES matters in the Specification.
- **Management of hazardous and nonhazardous wastes:** specify any applicable measures to minimize the generation of waste, and reuse, recycle and recover waste in a manner that is safe for human health and the environment including storage, transportation and disposal of hazardous wastes. See also GCC Sub-

Clauses 18.2 and 18.3 and the table above on Conditions of Contract that make reference to ES matters in the Specification.

- ***Management of chemicals and hazardous materials:*** *specify any applicable measures to minimize and control the release and use of hazardous materials for Works activities including the production, transportation, handling, and storage of the materials. See also GCC Sub-Clauses 18.2 and 18.3 and the table above on Conditions of Contract that make reference to ES matters in the Specification.*

- ***Biodiversity Conservation and Sustainable Management of Living Natural Resources***

The Employer shall specify, as applicable, Biodiversity Conservation and Sustainable Management of Living Natural Resources (see ESF - ESS6 and relevant guidance notes). This includes, as applicable:

- *invasive alien species: managing the risk of invasive alien species during the execution of the Works;*
- *sustainable management of living natural resources; and*
- *certification and verification requirements for the supply of natural resource materials where there is a risk of significant conversion or significant degradation of natural or critical habitats.*

See also GCC Sub-Clause 18.3 and the table above on Conditions of Contract that make reference to ES matters in the Specification.

- ***Road Safety***

- *State any specific traffic and road safety requirement, as applicable. See also Sub-Clause 9.3 of the General Conditions of Contract. For details, refer to the Guidance Note on Road safety.*

Key Personnel

[Note: Insert in the following table, the minimum key specialists required to execute the contract, taking into account the nature, scope, complexity and risks of the contract.]

Contractor's Representative and Key Personnel

Item No.	Position/specialization	Relevant academic qualifications	Minimum years of relevant work experience
1	Contractor's Representative		
2	<i>[Environmental]</i>	<i>[e.g. degree in relevant environmental subject]</i>	<i>[e.g. [years] working on road contracts in similar work environments]</i>
3	<i>[Health and Safety]</i>		
4	<i>[Social]</i>		
5	Sexual Exploitation, Abuse and Harassment <i>[Where a Project SEA risks are assessed to be substantial or high, Key Personnel shall include an expert(s) with relevant experience in addressing sexual exploitation, sexual abuse and sexual harassment cases]</i>		<i>[e.g. 5 years of monitoring and managing risks related to gender-based violence, out of which 3 years of relevant experience in addressing issues related to sexual exploitation, sexual abuse and sexual harassment]</i>
6	<i>modify as appropriate</i>		

Drawings

Supplementary Information

Part 3: Conditions of Contract & Contract Forms

Section VIII - General Conditions of Contract

These General Conditions of Contract (GCC), read in conjunction with the Particular Conditions of Contract (PCC) and other documents listed therein, should be a complete document expressing fairly the rights and obligations of both parties.

These General Conditions of Contract have been developed on the basis of considerable international experience in the drafting and management of contracts, bearing in mind a trend in the construction industry towards simpler, more straightforward language.

The GCC can be used for both smaller admeasurement contracts and lump sum contracts.

Table of Clauses

A. General.....	169
1. Definitions.....	169
2. Interpretation.....	172
4. Project Manager's Decisions	173
5. Delegation	173
6. Communications	173
7. Eligibility, Joint Venture and Subcontracting.....	173
8. Other Contractors.....	174
9. Personnel and Equipment	175
10. Employer's and Contractor's Risks	181
11. Employer's Risks	181
12. Contractor's Risks.....	181
14. Site Data.....	182
15. Contractor to Construct the Works	182
16. The Works to Be Completed by the Intended Completion Date	183
17. Approval by the Project Manager	183
18. Health, Safety and Protection of the Environment	183
19. Archaeological and Geological Findings.....	186
20. Possession of the Site.....	187
21. Access to the Site	187
22. Instructions, Inspections and Audits	187
23. Appointment of the Adjudicator	188
24. Procedure for Disputes.....	188
25. Fraud and Corruption.....	188
26. Stakeholder Engagement	189
27. Suppliers (other than Subcontractors).....	189
28. Code of Conduct	190
29. Security of the Site.....	191
B. Time Control.....	191
30. Program and Progress Report	191
31. Extension of the Intended Completion Date167.....	192
32. Acceleration	193
33. Delays Ordered by the Project Manager	193
34. Management Meetings.....	193
35. Early Warning	193
C. Quality Control	193
36. Identifying Defects.....	194
37. Tests	194
38. Correction of Defects.....	194
39. Uncorrected Defects.....	194
D. Cost Control.....	194
40. Contract Price.....	194

41.	Changes in the Contract Price	194
42.	Variations	195
43.	Cash Flow Forecasts	196
44.	Payment Certificates	196
45.	Payments	198
46.	Compensation Events.....	198
47.	Tax	200
48.	Currencies	200
49.	Price Adjustment.....	200
50.	Retention	201
51.	Liquidated Damages	201
52.	Bonus	201
53.	Advance Payment	201
54.	Securities.....	202
55.	Dayworks	202
56.	Cost of Repairs.....	202

E. Finishing the Contract 202

57.	Completion.....	202
58.	Taking Over	203
59.	Final Account.....	203
60.	Operating and Maintenance Manuals	203
61.	Termination.....	203
62.	Payment upon Termination.....	204
63.	Property.....	206
64.	Release from Performance	206
65.	Suspension of Bank Loan or Credit	206

Appendix A: To General Conditions 207

Fraud and Corruption..... 207

Appendix B: Environmental and Social (ES)..... 209

Metrics for Progress Reports..... 209

Appendix C: Eligible Countries..... 213

General Conditions of Contract

A. General

1. Definitions

1.1 Boldface type is used to identify defined terms.

- (a) The **Accepted Contract Amount** means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.
- (b) The **Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events.
- (c) The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC 23.
- (d) **i) Bank** means the financing institution **named in the PCC**; and **ii) Borrower** means the entity **named in the PCC**.
- (e) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid.
- (f) **Compensation Events** are those defined in GCC Clause 42 hereunder.
- (g) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC Sub-Clause 53.1.
- (h) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC Sub-Clause 2.3 below.
- (i) The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer.
- (j) The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer.
- (k) The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.
- (l) **Days** are calendar days; months are calendar months.

- (m) **Dayworks** are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.
- (n) A **Defect** is any part of the Works not completed in accordance with the Contract.
- (o) The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor.
- (p) The Defects Liability Period is the period **named in the PCC** pursuant to Sub-Clause 34.1 and calculated from the Completion Date.
- (q) **Drawings** means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract, include calculations and other information provided or approved by the Project Manager for the execution of the Contract.
- (r) The **Employer** is the party who employs the Contractor to carry out the Works, **as specified in the PCC**.
- (s) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.
- (t) **"In writing" or "written"** means hand-written, type-written, printed or electronically made, and resulting in a permanent record;
- (u) The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.
- (v) 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 PCC**. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.
- (w) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.
- (x) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.
- (y) The **Project Manager** is the person **named in the PCC** (or any other competent person appointed by the Employer 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.

- (z) **PCC** means Particular Conditions of Contract.
- (aa) The **Site** is the area **defined as such in the PCC**.
- (bb) **Site Investigation Reports** are those that were included in the bidding document and are factual and interpretative reports about the surface and subsurface conditions at the Site.
- (cc) **Specifications** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.
- (dd) The **Start Date is given in the PCC**. 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.
- (ee) 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.
- (ff) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.
- (gg) A **Variation** is an instruction given by the Project Manager which varies the Works.
- (hh) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, **as defined in the PCC**.
- (ii) “**Contractor’s Personnel**” refers to all personnel whom the Contractor utilizes on the Site or other places where the Works are carried out¹⁷¹, including the staff, labor and other employees of each Subcontractor.
- (jj) “**Key Personnel**” means the positions (if any) of the Contractor’s personnel that are stated in the Specifications.
- (kk) “**ES**” means Environmental and Social (including Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH));
- (ll) “**Sexual Exploitation and Abuse**” “**(SEA)**” means the following:

Sexual Exploitation is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to,

profiting monetarily, socially or politically from the sexual exploitation of another. In Bank financed operations/projects, sexual exploitation occurs when access to or benefit from a Bank financed Goods, Works, Non-consulting Services or Consulting Services is used to extract sexual gain;

Sexual Abuse is defined as the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;

- (mm) **“Sexual Harassment” “(SH)”** is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature by the Contractor’s Personnel with other Contractor’s or Employer’s Personnel; and
- (nn) **“Employer’s Personnel”** refers to the Project Manager and all other staff, labor and other employees (if any) of the Project Manager and of the Employer engaged in fulfilling the Employer’s obligations under the Contract; and any other personnel identified as Employer’s Personnel, by a notice from the Employer or the Project Manager to the Contractor.

2. Interpretation

- 2.1 In interpreting these GCC, words indicating one gender include all genders. Words indicating the singular also include the plural and words indicating the plural also include the singular. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.
- 2.2 If sectional completion is **specified in the PCC**, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).
- 2.3 The documents forming the Contract shall be interpreted in the following order of priority:
 - (a) Agreement,
 - (b) Letter of Acceptance,
 - (c) Contractor’s Bid,
 - (d) Particular Conditions of Contract,
 - (e) General Conditions of Contract, including Appendices,
 - (f) Specifications,
 - (g) Drawings,

- (h) Bill of Quantities,¹ and
 - (i) any other document **listed in the PCC** as forming part of the Contract.
- 3. Language and Law**
 - 3.1 The language of the Contract and the law governing the Contract are **stated in the PCC**.
 - 3.2 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer's Country when
 - (a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country; or
 - (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's Country prohibits any import of goods from that country or any payments to any country, person, or entity in that country.
- 4. Project Manager's Decisions**
 - 4.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.
- 5. Delegation**
 - 5.1 Unless otherwise **specified in the PCC**, the Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may revoke any delegation after notifying the Contractor.
- 6. Communications**
 - 6.1 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.
- 7. Eligibility, Joint Venture and Subcontracting**
 - 7.1 **Eligibility:** The Contractor and its Subcontractor or Suppliers shall have the nationality of an eligible country of the Bank in accordance with the Bank's Procurement Policy for the Bank Group Funded Operation described under the Bank's Procurement Framework, and as listed in Section V, Eligible Countries. The Contractor shall be deemed to have the nationality of a country if the Contractor is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or subconsultants for any part of the Contract including related Services. All

¹ In lump sum contracts, delete "Bill of Quantities" and replace with "Activity Schedule."

materials, equipment and services to be supplied under the Contract shall have their country of origin in an eligible country of the Bank in accordance with the Bank's Procurement Policy for Bank Group Funded Operations described under the Bank's Procurement Framework, and as listed in Section V, Eligible Countries under Appendix C to General Conditions.

7.2 Joint and Several Liability: If the Contractor constitutes (under applicable Laws) a joint venture, consortium or other unincorporated grouping of two or more persons:

- (a) unless otherwise **specified in the Particular Conditions of Contract (PCC)**, these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the Contract. Any limit on the maximum number of members in the Joint Venture, Consortium or Association shall be as **specified in the PCC**. Minimum share of a member of Joint Venture, Consortium or Association (JV) in the contract shall be as **specified in the PCC**;
- (b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and
- (c) the Contractor shall not alter its composition or legal status without the prior consent of the Employer.

7.3 Subcontracting: The Contractor may subcontract with the approval of the Project Manager but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations. The Contractor shall require that its Subcontractors execute the Works in accordance with the Contract, including complying with the relevant ES requirements and the obligations set out in Sub-Clause 28.1. However, the Contractor shall not subcontract the whole of the Works. Maximum aggregate participation of all Subcontractor in the contract by value shall not exceed the limit **specified in the PCC**.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as **referred to in the PCC**. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.

8.2 The Contractor shall also, as stated in the Specifications or as instructed by the Project Manager, cooperate with and allow appropriate opportunities for the Employer's or any other

personnel, notified to the Contractor by the Employer or Project Manager, to conduct any environmental and social assessment.

9. Personnel and Equipment

- 9.1 The Contractor shall employ the Key Personnel and use the Equipment identified in its Bid, to carry out the Works or other personnel and Equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of Key Personnel and Equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid.
- 9.2 The Project Manager may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Key Personnel (if any), who:
- (a) persists in any misconduct or lack of care;
 - (b) carries out duties incompetently or negligently;
 - (c) fails to comply with any provision of the Contract;
 - (d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment;
 - (e) based on reasonable evidence, is determined to have engaged in Fraud and Corruption during the execution of the Works;
 - (f) has been recruited from the Employer's Personnel;
 - (g) undertakes behavior which breaches the Code of Conduct for Contractor's Personnel (ES).

If appropriate, the Contractor shall then promptly appoint (or cause to be appointed) a suitable replacement with equivalent skills and experience.

Notwithstanding any requirement from the Project Manager to remove or cause to remove any person, the Contractor shall take immediate action as appropriate in response to any violation of (a) through (g) above. Such immediate action shall include removing (or causing to be removed) from the Site or other places where the Works are being carried out, any Contractor's Personnel who engages in (a), (b), (c), (d), (e) or (g) above or has been recruited as stated in (f) above."

- 9.3 The Contractor shall take all necessary safety measures to avoid the occurrence of incidents and injuries to any third party, associated with the use of, if any, Equipment on public roads or other public infrastructure. The Contractor shall monitor road safety incidents and accidents to identify negative safety issues, and establish and implement necessary measures to resolve them.

9.4 Labor

- 9.4.1 ***Engagement of Staff and Labor.*** The Contractor shall provide and employ on the Site for the execution of the Works such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from sources within the Country.

Unless otherwise provided in the Contract, the Contractor shall be responsible for the recruitment, transportation, accommodation and welfare facilities in accordance with GCC Sub-Clause 9.4.6, of the Contractor's Personnel, and for all payments in connection therewith.

The Contractor shall provide the Contractor's Personnel information and documentation that are clear and understandable regarding their terms and conditions of employment. The information and documentation shall set out their rights under relevant labor laws applicable to the Contractor's Personnel (which will include any applicable collective agreements), including their rights related to hours of work, wages, overtime, compensation and benefits, as well as those arising from any requirements in the Specifications. The Contractor's Personnel shall be informed when any material changes to their terms or conditions of employment occur.

- 9.4.2 ***Conditions of Labor.*** The Contractor shall inform the Contractor's Personnel about:

- (a) any deduction to their payment and the conditions of such deductions in accordance with the applicable laws or as stated in the Specifications; and
- (b) their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances and any benefits as are subject to tax under the laws of the Country for the time being in force.

The Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such laws.

Where required by applicable laws or as stated in the Specifications, the Contractor shall provide the Contractor's Personnel written notice of termination of employment and details of severance payments in a timely manner. The Contractor shall have paid the Contractor's Personnel (either directly or where appropriate for their benefit) all due wages and entitlements including, as applicable, social security benefits and pension contributions, on or before the end of their engagement/ employment.

- 9.4.3 The Contractor may bring into the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required

residence visas and work permits. The Employer will, if requested by the Contractor, use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor's personnel.

- 9.4.4 The Contractor shall at its own expense provide the means of repatriation to and the Contractor's Personnel employed on the Contract at the Site to their various home countries. It shall also provide suitable temporary maintenance of all such persons from the cessation of their employment on the Contract to the date programmed for their departure. In the event that the Contractor defaults in providing such means of transportation and temporary maintenance, the Employer may provide the same to such personnel and recover the cost of doing so from the Contractor.
- 9.4.5 ***Disorderly conduct.*** The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst the Contractor's Personnel.
- 9.4.6 ***Facilities for Staff and Labor.*** Except as otherwise stated in the Specifications, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. If stated in the Specifications, the Contractor shall give access to or provide services that accommodate the physical, social and cultural needs of the Contractor's Personnel. The Contractor shall also provide similar facilities for the Employer's Personnel if stated in the Specifications.
- 9.4.7 The Contractor shall, in all dealings with the Contractor's Personnel, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor. The Contractor shall provide the Contractor's Personnel annual holiday and sick, maternity and family leave, as required by applicable laws or as stated in the Specifications.
- 9.4.8 ***Supply of Foodstuffs.*** The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specifications at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.
- 9.4.9 ***Supply of Water.*** The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.
- 9.4.10 ***Measures against Insect and Pest Nuisance.*** The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The

Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

- 9.4.11 ***Alcoholic Liquor or Drugs.*** The Contractor shall not, otherwise than in accordance with the laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.
- 9.4.12 ***Arms and Ammunition.*** The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.
- 9.4.13 ***Funeral Arrangements.*** The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.
- 9.4.14 ***Forced Labor.*** The Contractor, including its Subcontractors, shall not employ or engage forced labor. Forced labor consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labor, such as indentured labor, bonded labor or similar labor-contracting arrangements.

No persons shall be employed or engaged who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harboring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.

- 9.4.15 ***Child Labor.*** The Contractor, including its Subcontractors, shall not employ or engage a child under the age of 14 unless the national law specifies a higher age (the minimum age).

The Contractor, including its Subcontractors, shall not employ or engage a child between the minimum age and the age of 18 in a manner that is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

The Contractor including its Subcontractors, shall only employ or engage children between the minimum age and the age of 18 after an appropriate risk assessment has been conducted by the Contractor with the Project Manager's approval. The Contractor shall be subject to regular monitoring by the Project Manager that includes monitoring of health, working conditions and hours of work.

Work considered hazardous for children is work that, by its nature or the circumstances in which it is carried out, is likely

to jeopardize the health, safety, or morals of children. Such work activities prohibited for children include work:

- (a) with exposure to physical, psychological or sexual abuse;
- (b) underground, underwater, working at heights or in confined spaces;
- (c) with dangerous machinery, equipment or tools, or involving handling or
- (d) transport of heavy loads;
- (e) in unhealthy environments exposing children to hazardous substances, agents, or processes, or to temperatures, noise or vibration damaging to health; or
- (f) under difficult conditions such as work for long hours, during the night or in confinement on the premises of the employer.

9.4.16 ***Employment Records of Workers.*** The Contractor shall keep complete and accurate records of the employment of labor at the Site. The records shall include the names, ages, genders, hours worked, and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the project Manager.

9.4.17 ***Workers' Organizations.*** In countries where the relevant labor laws recognize workers' rights to form and to join workers' organizations of their choosing and to bargain collectively without interference, the Contractor shall comply with such laws. In such circumstances, the role of legally established workers' organizations and legitimate workers' representatives will be respected, and they will be provided with information needed for meaningful negotiation in a timely manner. Where the relevant labor laws substantially restrict workers' organizations, the Contractor shall enable alternative means for the Contractor's Personnel to express their grievances and protect their rights regarding working conditions and terms of employment. The Contractor shall not seek to influence or control these alternative means. The Contractor shall not discriminate or retaliate against the Contractor's Personnel who participate, or seek to participate, in such organizations and collective bargaining or alternative mechanisms. Workers' organizations are expected to fairly represent the workers in the workforce.

9.4.18 ***Non-Discrimination and Equal Opportunity.*** The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and

shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.

Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure non-discrimination and equal opportunity, including for specific groups such as women, people with disabilities, migrant workers and children (of working age in accordance with GCC Sub-Clause 9.4.15).

- 9.4.19 ***Contractor's Personnel Grievance Mechanism.*** The Contractor shall have a grievance mechanism for Contractor's Personnel, and where relevant the workers' organizations stated in GCC Sub-Clause 9.4.17, to raise workplace concerns. The grievance mechanism shall be proportionate to the nature, scale, risks and impacts of the Contract. The mechanism shall address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned in a language they understand, without any retribution, and shall operate in an independent and objective manner.

The Contractor's Personnel shall be informed of the grievance mechanism at the time of engagement for the Contract, and the measures put in place to protect them against any reprisal for its use. Measures will be put in place to make the grievance mechanism easily accessible to all Contractor's Personnel.

The grievance mechanism shall not impede access to other judicial or administrative remedies that might be available, or substitute for grievance mechanisms provided through collective agreements.

The grievance mechanism may utilize existing grievance mechanisms, providing that they are properly designed and implemented, address concerns promptly, and are readily accessible to Contractor's Personnel. Existing grievance mechanisms may be supplemented as needed with Contract-specific arrangements.

- 9.4.20 ***Training of Contractor's Personnel.*** The Contractor shall provide appropriate training to relevant Contractor's Personnel on ES aspects of the Contract, including appropriate sensitization on prohibition of SEA and SH, and health and safety training referred to in GCC Sub-Clause 18.2.

As stated in the Specifications or as instructed by the Project Manager, the Contractor shall also allow appropriate opportunities for the relevant Contractor's Personnel to be

trained on ES aspects of the Contract by the Employer's Personnel.

The Contractor shall provide training on SEA and SH, including its prevention, to any of its personnel who has a role to supervise other Contractor's Personnel.

10. Employer's and Contractor's Risks

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Employer's Risks

11.1 From the Start Date until the Defects Liability Certificate has been issued, the following are Employer'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 Employer 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 Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

11.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to

181

- (a) a Defect which existed on the Completion Date,
- (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or
- (c) the activities of the Contractor on the Site after the Completion Date.

12. Contractor's Risks

12.1 From the Starting Date until the Defects Liability 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 Employer's risks are Contractor's risks.

13. Insurance

13.1 The Contractor shall provide, in the joint names of the Employer 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 PCC** 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.

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

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer 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.

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

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

14. Site Data

14.1 The Contractor shall be deemed to have examined any Site Data **referred to in the PCC**, supplemented by any information available to the Contractor.

15. Contractor to Construct the Works

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

15.2 If the Contract specifies that the Contractor shall design any part of the permanent Works, the Contractor shall take into the Employer's requirements which may include, if stated in the Specifications:

- (a) designing structural elements of the Works taking into account climate change considerations;
- (b) applying the concept of universal access (the concept of universal access means unimpeded access for people of

all ages and abilities in different situations and under various circumstances; and

- (c) considering the incremental risks of the public's potential exposure to operational accidents or natural hazards, including extreme weather events.

16. The Works to Be Completed by the Intended Completion Date

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

16.2 The Contractor shall not carry out mobilization to the Site unless the Project Manager gives approval, an approval that shall not be unreasonably delayed, to the measures the Contractor proposes to address environmental and social risks and impacts, which at a minimum shall include applying the Management Strategies and Implementation Plans (MSIPs) and Code of Conduct for Contractor's Personnel submitted as part of the Bid and agreed as part of the Contract.

The Contractor shall submit, to the Project Manager for its approval any additional MSIPs as are necessary to manage the ES risks and impacts of ongoing Works. These MSIPs collectively comprise the Contractor's Environmental and Social Management Plan (C-ESMP). The Contractor shall review the C-ESMP, periodically (but not less than every six (6) months), and update it as required to ensure that it contains measures appropriate to the Works. The updated C-ESMP shall be submitted to the Project Manager for its approval.

17. Approval by the Project Manager

17.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, for his approval.

17.2 The Contractor shall be responsible for design of Temporary Works.¹⁸³

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

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

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

18. Health, Safety and Protection

18.1 The Contractor shall be responsible for the safety of all activities on the Site.

**of the
Environment****18.2 The Contractor shall:**

- (a) comply with all applicable health and safety regulations and Laws;
- (b) comply with all applicable health and safety obligations specified in the Contract;
- (c) take care for the health and safety of all persons entitled to be on the Site and other places, if any, where the Works are being executed;
- (d) keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons;
- (e) provide fencing, lighting, safe access, guarding and watching of the Works until the issue of the Contract Certificate of Completion;
- (f) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land;
- (g) provide health and safety training of Contractor's Personnel as appropriate and maintain training records;
- (h) actively engage the Contractor's Personnel in promoting understanding, and methods for, implementation of health and safety requirements, as well as in providing information to Contractor's Personnel, training on occupational safety and health, and provision of personal protective equipment without expense to the Contractor's Personnel;
- (i) put in place workplace processes for Contractor's Personnel to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health;
- (j) Contractor's Personnel who remove themselves from such work situations shall not be required to return to work until necessary remedial action to correct the situation has been taken. Contractor's Personnel shall not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal;
- (k) where the Employer's Personnel, any other contractors employed by the Employer, and/or personnel of any legally constituted public authorities and private utility companies are employed in carrying out, on or near the site, of any work not included in the Contract, collaborate in applying

the health and safety requirements, without prejudice to the responsibility of the relevant entities for the health and safety of their own personnel; and

- (l) establish and implement a system for regular (not less than six-monthly) review of health and safety performance and the working environment.

Subject to GCC Sub-Clause 16.2, the Contractor shall submit to the Project Manager for its approval a health and safety manual which has been specifically prepared for the Works, the Site and other places (if any) where the Contractor intends to execute the Works.

The health and safety manual shall be in addition to any other similar document required under applicable health and safety regulations and laws.

The health and safety manual shall set out all the health and safety requirements under the Contract,

- (a) which shall include at a minimum:

- (i) the procedures to establish and maintain a safe working environment without risk to health at all workplaces, machinery, equipment and processes under the control of the Contractor, including control measures for chemical, physical and biological substances and agents;
- (ii) details of the training to be provided, records to be kept;
- (iii) the procedures for prevention, preparedness and response activities to be implemented in the case of an emergency event (i.e. an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons including failure to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning);
- (iv) remedies for adverse impacts such as occupational injuries, deaths, disability and disease;
- (v) the measures to be taken to avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases,
- (vi) the measures to be implemented to avoid or minimize the spread of communicable diseases (including transfer of Sexually Transmitted Diseases or Infections (STDs), such as HIV virus) and non-

communicable diseases associated with the execution of the Works, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups. This includes taking measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent Contract-related labor;

- (vii) the policies and procedures on the management and quality of accommodation and welfare facilities if such accommodation and welfare facilities are provided by the Contractor in accordance with GCC Sub-Clause 9.4.6; and

- (b) any other requirements stated in the Specifications.

18.3 Protection of the environment

- (a) The Contractor shall take all necessary measures to: protect the environment (both on and off the Site); and
- (b) limit damage and nuisance to people and property resulting from pollution, noise and other results of the Contractor's operations and/ or activities.

The Contractor shall ensure that emissions, surface discharges, effluent and any other pollutants from the Contractor's activities shall exceed neither the values indicated in the Specifications, nor those prescribed by applicable laws.

In the event of damage to the environment, property and/or nuisance to people, on or off Site as a result of the Contractor's operations, the Contractor shall agree with the Project Manager the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The Contractor shall implement such remedies at its cost to the satisfaction of the Project Manager.

19. Archaeological and Geological Findings

- 19.1 All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural or religious interest found on the Site shall be placed under the care and custody of the Employer. The Contractor shall:

- (a) take all reasonable precautions, including fencing-off the area or site of the finding, to avoid further disturbance and prevent Contractor's Personnel or other persons from removing or damaging any of these findings;
- (b) train relevant Contractor's Personnel on appropriate actions to be taken in the event of such findings; and
- (c) implement any other action consistent with the requirements of the Specifications and relevant laws.

The Contractor shall, as soon as practicable after discovery of any such finding, notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.

20. Possession of the Site

20.1 The Employer 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 PCC**, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.

21. Access to the Site

21.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager (including the Bank staff or consultants acting on the Bank's behalf, stakeholders and third parties, such as independent experts, local communities, or non-governmental organizations), including to carry out environmental and social audit, as appropriate, 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.

22. Instructions, Inspections and Audits

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

22.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and subconsultants to keep, accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs.

22.3 Inspections & Audit by the Bank

Pursuant to paragraph 2.2 e. of Appendix A to the General Conditions-Fraud and Corruption, the Contractor shall permit and shall cause its agents (where declared or not), subcontractors, subconsultants, service providers, suppliers, and personnel, to permit, the Bank ~~and~~ or persons appointed by the Bank to inspect the Site and/or the accounts and records relating to the procurement process, selection and/or contract execution, and to have such accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have such accounts, records and other documents audited by auditors appointed by the Bank. The Contractor's and its Subcontractors' and subconsultants' attention is drawn to Sub-Clause 25.1 (Fraud and Corruption) which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures).

23. Appointment of the Adjudicator

- 23.1 The Adjudicator shall be appointed jointly by the Employer and the Contractor, at the time of the Employer's issuance of the Letter of Acceptance. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority **designated in the PCC**, to appoint the Adjudicator within 14 days of receipt of such request.
- 23.2 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority **designated in the PCC** at the request of either party, within 14 days of receipt of such request.

24. Procedure for Disputes

- 24.1 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.
- 24.2 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.
- 24.3 The Adjudicator shall be paid by the hour at the **rate specified in the PCC**, together with reimbursable expenses of the types **specified in the PCC**, and the cost shall be divided equally between the Employer 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 shall be final and binding.
- 24.4 The arbitration shall be conducted in accordance with the arbitration procedures published by the institution named and in the place **specified in the PCC**.

25. Fraud and Corruption

- 25.1 The Bank requires compliance with the Integrity Framework comprising the African Development Bank Group's Sanctions Procedures, the Bank's Whistleblowing and Complaints Policy, the Bank's Procurement Policy under the Procurement Framework and any other applicable Policies and Procedures including their updates, as set forth in Appendix A to the GCC.
- 25.2 The Employer requires the Contractor to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the bidding process or

execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.

26. Stakeholder Engagement

26.1 The Contractor shall provide relevant contract-related information, as the Employer and/or Project Manager may reasonably request to conduct Stakeholder engagements. “Stakeholder” refers to individuals or groups who:

- (i) are affected or likely to be affected by the Contract; and
- (ii) may have an interest in the Contract.

The Contractor may also directly participate in Stakeholder engagements, as the Employer and/or Project Manager may reasonably request.

27. Suppliers (other than Subcontractors)

27.1 *Forced Labor:* The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage forced labor including trafficked persons as described in GCC Sub-Clause 9.4.14. If forced labor/trafficking cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.

27.2 *Child Labor:* The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage child labor as described in GCC Sub-Clause 9.4.15. If child labor cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.

27.3 *Serious Safety Issues:* The Contractor, including its Subcontractors, shall comply with all applicable safety obligations, including as stated in GCC Sub-Clause 18.2. The Contractor shall also take measures to require its suppliers (other than Subcontractors) to adopt procedures and mitigation measures adequate to address safety issues related to their personnel. If serious safety issues are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.

27.4 *Obtaining natural resource materials in relation to supplier:* The Contractor shall obtain natural resource *materials* from suppliers that can demonstrate, through compliance with the applicable verification and/ or certification requirements, that obtaining such materials is not contributing to the risk of significant conversion or

significant degradation of natural or critical habitats such as unsustainably harvested wood products, gravel or sand extraction from river beds or beaches.

If a supplier cannot continue to demonstrate that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to demonstrate that they are not significantly adversely impacting the habitats.

28.1 The Contractor shall have a Code of Conduct for the Contractor's Personnel.

The Contractor shall take all necessary measures to ensure that each Contractor's Personnel is made aware of the Code of Conduct including specific behaviors that are prohibited, and understands the consequences of engaging in such prohibited behaviors.

These measures include providing instructions and documentation that can be understood by the Contractor's Personnel and seeking to obtain that person's signature acknowledging receipt of such instructions and/or documentation, as appropriate.

The Contractor shall also ensure that the Code of Conduct is visibly displayed in multiple locations on the Site and any other place where the Works will be carried out, as well as in areas outside the Site accessible to the local community and project affected people. The posted Code of Conduct shall be provided in languages comprehensible to Contractor's Personnel, Employer's Personnel and the local community.

The Contractor's Management Strategy and Implementation Plans shall include appropriate processes for the Contractor to verify compliance with these obligations.

28. Code of Conduct

29.1 The Contractor shall be responsible for the security of the Site, and:

- (a) for keeping unauthorized persons off the Site;
- (b) authorized persons shall be limited to the Contractor's Personnel, the Employer's Personnel, and to any other personnel identified as authorized personnel (including the Employer's other contractors on the Site), by a notice from the Employer or the Project Manager to the Contractor.

Subject to GCC Sub-Clause 16.2, the Contractor shall submit for the Project Manager's No-objection a security management plan that sets out the security arrangements for the Site.

The Contractor shall (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards Contractor's Personnel, Employer's Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Specifications.

29. Security of the Site

The Contractor shall not permit any use of force by security personnel in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.

In making security arrangements, the Contractor shall also comply with any additional requirements stated in the Specifications."

B. Time Control

30. Program and Progress Report

- 30.1 Within the time **stated in the PCC**, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule. The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.
- 30.2 An update of the Program shall be a program showing the actual progress achieved on each activity¹⁰¹ and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.
- 30.3 The Contractor shall monitor progress of the Works and submit to the Project manager progress report and any updated Program showing the actual progress achieved and the effect of the progress achieved on the timing of the remaining Works, including any changes to the sequence of the activities, at intervals no longer than the period **stated in the PCC**. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount **stated in the PCC** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of a lump sum contract, the Contractor shall provide an updated

Activity Schedule within 14 days of being instructed to by the Project Manager.

30.4 Unless otherwise stated in the Specifications, each progress report shall include the Environmental and Social (ES) metrics set out in Appendix B.

30.5 In addition to the progress reports, the Contractor shall inform the Project Manager immediately of any allegation, incident or accident in the Site, which has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer's Personnel or Contractor's Personnel. This includes, but is not limited to, any incident or accident causing fatality or serious injury; significant adverse effects or damage to private property; or any allegation of SEA and/or SH. In case of SEA and/or SH, while maintaining confidentiality as appropriate, the type of allegation (sexual exploitation, sexual abuse or sexual harassment), gender and age of the person who experienced the alleged incident should be included in the information.

The Contractor, upon becoming aware of the allegation, incident or accident, shall also immediately inform the Project Manager of any such incident or accident on the Subcontractors' or suppliers' premises relating to the Works which has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer's Personnel, or Contractor's, its Subcontractors' and suppliers' personnel. The notification shall provide sufficient detail regarding such incidents or accidents. The Contractor shall provide full details of such incidents or accidents to the Project Manager within the timeframe agreed with the Project Manager.

The Contractor shall require its Subcontractors and suppliers (other than Subcontractors) to immediately notify the Contractor of any incidents or accidents referred to in this Subclause.

**31. Extension of
the Intended
Completion
Date**

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

31.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a

delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

- 32. Acceleration**
- 32.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.
- 32.2 If the Contractor's priced proposals for an acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
- 33. Delays Ordered by the Project Manager**
- 33.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.
- 34. Management Meetings**
- 34.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
- 34.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
- 35. Early Warning**
- 35.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.
- 35.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

C. Quality Control

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

D. Cost Control

- | | |
|--|---|
| 40. Contract Price² | 40.1 The Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item. |
| 41. Changes in the Contract Price³ | 41.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is |

² In lump sum contracts, replace GCC Sub-Clauses 40.1 as follows:

40.1 The Contractor shall provide updated Activity Schedules within 14 days of being instructed to by the Project Manager. The Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for materials on site shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.

³ In lump sum contracts, replace entire GCC Clause 41 with new GCC Sub-Clause 41.1, as follows:

41.1. The Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.

exceeded by more than 15 percent, except with the prior approval of the Employer.

41.2 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 updated Programs⁴ produced by the Contractor.

42.2 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 (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

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

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

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

42.6 If the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work 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, ¹⁹⁵ 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.⁵

42.7 Value Engineering: The Contractor may prepare, at its own cost, a value engineering proposal at any time during the performance of the contract. The value engineering proposal shall, at a minimum, include the following;

- (a) the proposed change(s), and a description of the difference to the existing contract requirements;

⁴ In lump sum contracts, add "and Activity Schedules" after "Programs."

⁵ In lump sum contracts, delete this paragraph.

- (b) a full cost/benefit analysis of the proposed change(s) including a description and estimate of costs (including life cycle costs) the Employer may incur in implementing the value engineering proposal;
- (c) a description of any effect(s) of the change on performance/functionality; and
- (d) a description of the proposed work to be performed, a program for its execution and sufficient ES information to enable an evaluation of ES risks and impacts

The Employer may accept the value engineering proposal if the proposal demonstrates benefits that:

- (a) accelerate the contract completion period; or
- (b) reduce the Contract Price or the life cycle costs to the Employer; or
- (c) improve the quality, efficiency, safety or sustainability of the Facilities; or
- (d) yield any other benefits to the Employer,

without compromising the functionality of the Works.

If the value engineering proposal is approved by the Employer and results in:

- (a) a reduction of the Contract Price; the amount to be paid to the Contractor shall be the **percentage specified in the PCC** of the reduction in the Contract Price; or
- (b) an increase in the Contract Price; but results in a reduction in life cycle costs due to any benefit described in (a) to (d) above, the amount to be paid to the Contractor shall be the full increase in the Contract Price.

43. Cash Flow Forecasts

- 43.1 When the Program,⁶ 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.

44. Payment Certificates

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

⁶ In lump sum contracts, add "or Activity Schedule" after "Program."

- 44.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.
- 44.3 The value of work executed shall be determined by the Project Manager.
- 44.4 The value of work executed shall comprise the value of the quantities of work in the Bill of Quantities that have been completed.⁷
- 44.5 The value of work executed shall include the valuation of Variations and Compensation Events.
- 44.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.
- 44.7 If the Contractor was, or is, failing to perform any ES obligations or work under the Contract, the value of this work or obligation, as determined by the Project Manager, may be withheld until the work or obligation has been performed, and/or the cost of rectification or replacement, as determined by the Project Manager, may be withheld until rectification or replacement has been completed. Failure to perform includes, but is not limited to the following:
- (a) failure to comply with any ES obligations or work described in the Works' Requirements which may include: working outside site boundaries, excessive dust, failure to keep public roads in a safe usable condition, damage to offsite vegetation, pollution of water courses from oils or sedimentation, contamination of land e.g. from oils, human waste, damage to archeology or cultural heritage features, air pollution as a result of unauthorized and/or inefficient combustion;
 - (b) failure to regularly review⁴⁹⁷ C-ESMP and/or update it in a timely manner to address emerging ES issues, or anticipated risks or impacts;
 - (c) failure to implement the C-ESMP e.g. failure to provide required training or sensitization;
 - (d) failing to have appropriate consents/permits prior to undertaking Works or related activities;
 - (e) failure to submit ES report/s (as described in Appendix B), or failure to submit such reports in a timely manner;

⁷ In lump sum contracts, replace this paragraph with the following: "The value of work executed shall comprise the value of completed activities in the Activity Schedule."

- (f) failure to implement remediation as instructed by the Project Manager within the specified timeframe (e.g. remediation addressing non-compliance/s).
- 45. Payments**
- 45.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer 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.
- 45.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.
- 45.3 Unless otherwise stated, all payments and deductions shall be paid or charged in the proportions of currencies comprising the Contract Price.
- 45.4 Items of the Works for which no rate or price has been entered in shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.
- 46. Compensation Events**
- 46.1 The following shall be Compensation Events:
- (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC Sub-Clause 20.1.
 - (b) The Employer 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 bidders (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 Employer, or additional work required for safety or other reasons.
- (h) Other contractors, public authorities, utilities, or the Employer 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 Employer's Risks.
- (k) The Project Manager unreasonably delays issuing a Certificate of Completion.

46.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contractor shall notify the Project Manager as soon as possible but not later than 14 days from the date of its occurrence indicating the nature of the event, the extent of extension required of the intended completion date and/or of increase in the Contract price it claims including Contractor's revised forecast cost along with all supporting documents satisfactory to the Project Manager. Contractor's failure to notify the Project Manager as above will be the cause for rejection of any claims subsequently made unless the Contractor has requested, explaining reasons for delay, and the Project Manager has agreed to allow additional time for submission of the claims and supporting documents. Contractor's notification expressing intention to claim any compensation in the future will not be considered and will not entitle the Contractor for such compensations.

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

46.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the

Contractor's not having given early warning or not having cooperated with the Project Manager.

- | | | |
|-----------------------------|------|--|
| 47. Tax | 47.1 | 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 bids 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 GCC Clause 49. |
| 48. Currencies | 48.1 | Where payments are made in currencies other than the currency of the Employer's Country specified in the PCC , the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Bid. |
| 49. Price Adjustment | 49.1 | Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the PCC . If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due in each currency. A separate formula of the type specified below applies to each Contract currency: |

$$P_c = A_c + B_c \text{ Imc/Ioc}$$

where:

P_c is the adjustment factor for the portion of the Contract Price payable in a specific currency "c."

A_c and B_c are coefficients⁸ **specified in the PCC**, representing the nonadjustable and adjustable portions, respectively, of the Contract Price payable in that specific currency "c;" and

Imc is the index prevailing at the end of the month being invoiced and Ioc is the index prevailing 28 days before Bid opening for inputs payable; both in the specific currency "c." In cases where the "currency of index" is not the relevant currency of payment, each index shall be converted into the relevant currency of payment at the selling rate, established by the central bank of the Country, of this relevant currency of payment on the above date for which the index is required to be applicable.

- | | |
|------|---|
| 49.2 | If the value of the index is changed after it has been used in a calculation, the calculation shall be corrected and an adjustment made in the next payment certificate. The index value shall be |
|------|---|

⁸ Above formula will be expanded to include adjustments for other applicable input elements such as C, D, E, etc. based on the Schedules of Adjustment Data and the bid of the Contractor such that sum of all coefficients A, B, C, D, E, etc. will be equal to 1.00 in the formula for each currency. The fixed coefficient shall be the same in the formulae for all currencies, since coefficient A, for the nonadjustable portion of the payments, is a very approximate figure (usually 0.15) to take account of fixed cost elements. Normally, the coefficient for the same input element may also be the same in the formulae for all currencies. The sum of the adjustments for each currency are added to the Contract Price.

deemed to take account of all changes in cost due to fluctuations in costs.

50. Retention

50.1 The Employer shall retain from each payment due to the Contractor the proportion **stated in the PCC** until Completion of the whole of the Works.

50.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with GCC 57.1, half the total amount retained shall be repaid to the Contractor and 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. The Contractor may substitute retention money with an “on demand” Bank guarantee as per Retention Money Security Demand Guarantee Form attached in Section X-Contract Forms.

51. Liquidated Damages

51.1 The Contractor shall pay liquidated damages to the Employer at the rate per day **stated in the PCC** 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 PCC**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor’s liabilities.

51.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC Sub-Clause 45.1.

52. Bonus

52.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day **stated in the PCC** 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.

53. Advance Payment

53.1 The Employer shall make advance payment to the Contractor of the amounts **stated in the PCC** by the date **stated in the PCC**, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer 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 shall not be charged on the advance payment.

- 53.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.
- 53.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.
- 54. Securities**
- 54.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount **specified in the PCC**, by a bank or surety acceptable to the Employer, 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.
- 55. Dayworks**
- 55.1 If applicable, the Dayworks rates in the Contractor's Bid shall be used only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.
- 55.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.
- 55.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.
- 56. Cost of Repairs**
- 56.1 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

- 57. Completion**
- 57.1 The Contractor shall request the Project Manager to issue a Certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the whole of the Works is completed.

- | | | |
|--|------|--|
| 58. Taking Over | 58.1 | The Employer shall take over the Site and the Works within seven days of the Project Manager's issuing a certificate of Completion. |
| 59. Final Account | 59.1 | The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate. |
| 60. Operating and Maintenance Manuals | 60.1 | If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the PCC . |
| | 60.2 | If the Contractor does not supply the Drawings and/or manuals by the dates stated in the PCC pursuant to GCC Sub-Clause 60.1, or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount stated in the PCC from payments due to the Contractor. |
| 61. Termination | 61.1 | The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. |
| | 61.2 | Fundamental breaches of Contract shall include, but shall not be limited to, the following: <ul style="list-style-type: none"> (a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program 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 Employer 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 Employer 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;
- (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 PCC**; or
- (h) if the Contractor, in the judgment of the Employer has engaged in Fraud and Corruption, as defined in paragraph 2.2 a of the Appendix A to the GCC, in competing for or in executing the Contract, then the Employer may, after giving fourteen (14) days written notice to the Contractor, terminate the Contract and expel him from the Site.

61.3 Notwithstanding the above, the Employer may terminate the Contract for convenience.

61.4 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.

61.5 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 GCC Sub-Clause 61.2 above, the Project Manager shall decide whether the breach is fundamental or not.

62. Payment upon Termination

62.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager after obtaining approval of the Employer shall issue a certificate for payment determining the amount payable to or due from the Contractor based on the value of the work done in accordance with the following formula. To this end, elements of costs such as value of work done, and amounts paid or payable are reckoned up to the date of issue of the certificate. In calculating these costs, in addition to the unit prices [or priced activities, if applicable] as per the contract or subsequent amendments, if any, the Project Manager will take into account all amounts already agreed to be paid and/or paid to the Contractor and amounts agreed to be recovered and/or recovered from the Contractor in connection with or arising out of all applicable provisions under Section D and/or other parts of the Contract. An amount derived as per the percentage of the value of the work not completed and **specified in the PCC** representing the Employer's cost for completing the Works, will be deducted from amount payable to the Contractor or shall be a debt payable to the Employer if the

payments due to the Employer exceeds amount payable to the Contractor in which case provision under clause 62.3 shall apply.

62.2 Applicable Formula for final payment:

Mco=[Wco-Wem-W1em-W2em-W3em-W4em+W1co+W2co] where;

Mco, is the amount payable to the Contractor;

Wco, is the value of the work done by the Contractor;

Wem, is the value of work paid by the Employer to the Contractor;

W1em, is the value derived by applying a percentage specified in the PCC to the value of the work not completed;

W2em, is the value of the advance payment received by the Contractor which remains outstanding for repayment;

W3em, is value of any Liquidated Damages accrued to the Employer for the delay if any, in completion of work done by the Contractor but not recovered by or paid to the Employer. No additional Liquidated Damages will be applicable for work not completed beyond the date of completion of the work done;

W4em, is all other payments due to the Employer as per applicable provisions under Section D and/or other parts of the Contract including any excess payments of the past invoices already claimed by the Employer but not recovered from or paid by the Contractor;

W1co, is all payments due to the Contractor as per applicable provisions under Section D and/or other parts of the Contract including any under payments of the past invoices which were claimed by Contractor and agreed by the Project Manager or the Employer but not paid to the Contractor; and

W2co is value of Materials already brought to the construction site by the Contractor, prior to the receipt of the Employer's notice of termination of the Contract, which has not been paid to the Contractor that such materials would be required for the sole purpose of completion of the Contract subject to submission of documentary evidence of the cost of the materials satisfactory to the Employer and Contractor placing the Materials at the Employer's disposal when paid by the Employer.

- 62.3 If the value of M_{co} in the above formula under GCC 62.2 is negative i.e. if the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer. The Contractor shall make the payment to the Employer within 14 days after notification by the Project Manager.
- 62.4 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, all the above provisions under sub-clauses 62.1, 62.2 and 62.3 shall apply and the Project Manager, after obtaining approval of the Employer, shall issue a payment certificate accordingly subject to the following additional amounts payable to the Contractor provided, however, the Contractor submitted satisfactory documentary evidence in support of such expenditures, namely: i) the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works (W_{3co}); and ii) the Contractor's costs of protecting and securing the Works (W_{4co}). In this case the formula indicted under GCC 62.2 will be $[M_{co}=W_{co}-W_{em}-W_{1em}-W_{2em}-W_{3em}-W_{4em}+W_{1co}+W_{2co}+W_{3co}+W_{4co}]$; each element as defined under GCC 62.2 and GCC 62.4]
- 63. Property** 63.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.
- 64. Release from Performance** 64.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer 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.
- 65. Suspension of Bank Loan or Credit** 65.1 In the event that the Bank suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made:
- (a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received the Bank's suspension notice.
 - (b) If the Contractor has not received sums due to it within the 28 days for payment provided for in Sub-Clause 45.1, the Contractor may immediately issue a 14-day termination notice.

Appendix A: To General Conditions

Fraud and Corruption

(Text in this Appendix shall not be modified)

1. Purpose

1.1 The Bank's Integrity Framework and this annex apply with respect to procurement under Bank Investment Project Financing operations.

2. Requirements

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

- a. Defines, for the purposes of this provision, the terms set forth below as follows:
 - i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
 - ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;
 - iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - v. "obstructive practice" is:
 - (a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank 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; or
 - (b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.
- b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly

- or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring misprocurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
 - d. Pursuant to the Bank's Integrity Framework and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;³⁰ (ii) to be a nominated³¹ sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;
 - e. Requires that a clause be included in bidding/ documents and in contracts financed by a Bank loan, requiring (i) bidders(applicants), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect³² all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the Bank.

³⁰ For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

³¹ A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

³² Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

Appendix B: Environmental and Social (ES)

Metrics for Progress Reports

Metrics for regular reporting:

- a. environmental incidents or non-compliances with contract requirements, including contamination, pollution or damage to ground or water supplies;*
- b. health and safety incidents, accidents, injuries and all fatalities that require treatment;*
- c. interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none);*
- d. status of all permits and agreements:*
 - i) work permits: number required, number received, actions taken for those not received;*
 - ii) status of permits and consents:*
 - list areas/facilities with permits required (quarries, asphalt & batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to resident engineer (or equivalent), status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.);
 - list areas with landowner agreements required (borrow and spoil areas, camp sites), dates of agreements, dates submitted to resident engineer (or equivalent);
 - identify major activities undertaken in each area in the reporting period and highlights of environmental and social protection (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation);
 - for quarries: status of relocation and compensation (completed, or details of activities and current status in the reporting period).

209

- e. health and safety supervision:*
 - i. safety officer: number days worked, number of full inspections & partial inspections, reports to construction/project management;*
 - ii. number of workers, work hours, metric of PPE use (percentage of workers with full personal protection equipment (PPE), partial, etc.), worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, follow-up actions taken (if any);*
- f. worker accommodations:*
 - i. number of expats housed in accommodations, number of locals;*

- ii. date of last inspection, and highlights of inspection including status of accommodations' compliance with national and local law and good practice, including sanitation, space, etc.;
 - iii. actions taken to recommend/require improved conditions, or to improve conditions.
- g. *Health services: provider of health services, information and/or training, location of clinic, number of non-safety disease or illness treatments and diagnoses (no names to be provided);*
- h. *gender (for expats and locals separately): number of female workers, percentage of workforce, gender issues raised and dealt with (cross-reference grievances or other sections as needed);*
- i. *training:*
 - i. number of new workers, number receiving induction training, dates of induction training;
 - ii. number and dates of toolbox talks, number of workers receiving Occupational Health and Safety (OHS), environmental and social training;
 - iii. number and dates of HIV/AIDS sensitization and/or training, no. workers receiving training (this reporting period and in the past); same questions for gender sensitization, flag person training.
 - iv. number and date of GBV /SEA sensitization and/or training, number of workers receiving training on code of conduct (in the reporting period and in the past), etc.
- j. *environmental and social supervision:*
 - i. environmentalist: days worked, areas inspected and numbers of inspections of each (road section, work camp, accommodations, quarries, borrow areas, spoil areas, swamps, forest crossings, etc.), highlights of activities/findings (including violations of environmental and/or social best practices, actions taken), reports to environmental and/or social specialist/construction/site management;
 - ii. sociologist: days worked, number of partial and full site inspections (by area: road section, work camp, accommodations, quarries, borrow areas, spoil areas, clinic, HIV/AIDS center, community centers, etc.), highlights of activities (including violations of environmental and/or social requirements observed, actions taken), reports to environmental and/or social specialist/construction/site management; and
 - iii. community liaison person(s): days worked (hours community center open), number of people met, highlights of activities (issues raised, etc.), reports to environmental and/or social specialist /construction/site management.
- k. *Grievances:* list new grievances (e.g. allegations of GBV / SEA) received in the reporting period and unresolved past grievances by date received, complainant, how received, to whom referred to for action, resolution and date (if completed), data

resolution reported to complainant, any required follow-up (Cross-reference other sections as needed):

- i. Worker grievances;
- ii. Community grievances

l. Traffic and vehicles/equipment:

- i. traffic accidents involving project vehicles & equipment: provide date, location, damage, cause, follow-up;
- ii. accidents involving non-project vehicles or property (also reported under immediate metrics): provide date, location, damage, cause, follow-up;
- iii. overall condition of vehicles/equipment (subjective judgment by environmentalist); non-routine repairs and maintenance needed to improve safety and/or environmental performance (to control smoke, etc.).

m. Environmental mitigations and issues (what has been done):

- i. dust: number of working bowzers, number of watering/day, number of complaints, warnings given by environmentalist, actions taken to resolve; highlights of quarry dust control (covers, sprays, operational status); % of rock/spoil lorries with covers, actions taken for uncovered vehicles;
- ii. erosion control: controls implemented by location, status of water crossings, environmentalist inspections and results, actions taken to resolve issues, emergency repairs needed to control erosion/ sedimentation;
- iii. quarries, borrow areas, spoil areas, asphalt plants, batch plants: identify major activities undertaken in the reporting period at each, and highlights of environmental and social protection: land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation;
- iv. blasting: number of blasts (and locations), status of implementation of blasting plan (including notices, evacuations, etc.), incidents of off-site damage or complaints (cross-reference other sections as needed);
- v. spill cleanups, if any: material spilled, location, amount, actions taken, material disposal (report all spills that result in water or soil contamination);
- vi. waste management: types and quantities generated and managed, including amount taken offsite (and by whom) or reused/recycled/disposed on-site;
- vii. details of tree plantings and other mitigations required undertaken in the reporting period;
- viii. details of water and swamp protection mitigations required undertaken in the reporting period.

n. compliance:

- i. compliance status for conditions of all relevant consents/permits, for the Work, including quarries, etc.): statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance;

- ii. compliance status of C-ESMP/ESIP requirements: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
- iii. compliance status of GBV/SEA prevention and response action plan: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
- iv. compliance status of Health and Safety Management Plan re: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
- v. other unresolved issues from previous reporting periods related to environmental and social: continued violations, continued failure of equipment, continued lack of vehicle covers, spills not dealt with, continued compensation or blasting issues, etc. Cross-reference other sections as needed.

Appendix C: Eligible Countries

Eligibility for the Provision of Goods, Works and Non-Consulting Services in Bank-Financed Procurement

A. Provisions under Section 5 “Eligibility” of the Procurement Policy for Bank Group Funded Operations and Chapter A of Volume 1 of the Operations Procurement Manual under Procurement Framework of the African Development Bank

The African Development Fund permits firms and individuals from all countries to offer goods, works and services for ADF funded projects. However, the proceeds of any Financing undertaken in the operations of the African Development Bank and the Nigeria Trust Fund shall be used for procurement of goods and works, including the related services, provided by bidders from Eligible Countries³³. Any conditions for participation shall be limited to those that are essential to ensure the firm’s capability to fulfill the contract in question. In the case of ADB and NTF, bidders from non-Member Countries offering goods, works and related services (including transportation and insurance) are not eligible even if they offer these from Eligible Member Countries. Any waiver to this rule will be in accordance with the Articles 17(1) (d) of the Agreement Establishing the African Development Bank and 4.1 of the Agreement Establishing the Nigeria Trust Fund.

B. Rules and Procedures for Procurement of Goods and Works

Overview

The eligibility criteria for participation in the supply of goods, works and related services, to be procured through the ADB and NTF Financing, derive from the requirements of the Agreement Establishing the African Development Bank, Article 17.1.d, and the Agreement Establishing the Nigeria Trust Fund, Article 4.1. The foregoing requirements basically prescribe two types of eligibility criteria:

213

- (a) The eligibility of the bidder;
- (b) The eligibility of the goods, works and related services.

Eligibility of the Bidder

The eligibility of the bidder shall be based on nationality, in accordance with the following rules:

- (a) Natural Persons: A natural person is eligible if he or she is a national of a Member Country of the Bank, or a State Participant of the Fund. Where a person has more than

³³ “Eligible Countries” shall mean: (a) in the case of the African Development Bank and the Nigeria trust Fund, the Member Countries of the African Development Bank; and (b) in the case of the African Development Fund, any country.

one nationality, such a person shall be eligible if the nationality indicated in his or her bid is that of a Member Country of the Bank, or a State Participant of the Fund.

(b) Corporations: A corporation is eligible if it satisfies the following criteria:

1. it is incorporated in a country that is a Member of the Bank, or State Participant of the Fund;
2. it is a national of a country that is a Member of the Bank, or State Participant of the Fund, as determined by the law of its place of incorporation;
3. it has its principal place of business in a country that is a Member of the Bank, or State Participant of the Fund.

(c) Joint Ventures and Associations: An unincorporated joint venture, partnership, or association, shall be eligible if more than 50% of the value of its works and/or services is executed by its members satisfying the eligibility requirements for individuals or corporations.

Eligibility of the Goods, Works and Related Services

In order to be eligible, the goods to be procured must have been mined, grown, or produced, in the form in which they are purchased, in an Eligible Member Country.

For works contracts, which may include civil works, plant construction, or turnkey contracts, the contractor must satisfy the nationality criteria of eligibility, either as a natural person, or corporation, or joint venture and association. Labour, equipment, and materials needed for carrying out the works contract, shall be supplied from Eligible Member Countries.

For contracts, which have been awarded on the basis of Cost, Insurance and Freight (CIF), or Carriage and Insurance Paid (CIP), bidders shall be free to arrange for ocean and other transportation, and the related insurance, from any Eligible Member Country. On the other hand, where goods are shipped on FOB basis, and the Bank has agreed to finance transportation and insurance separately, which are arranged by the purchaser, under a separate contract, the Bank shall be satisfied that the services are supplied from Eligible Member Countries.

List of Eligible Countries

List of Eligible countries can be found in African Development Bank's website:

<https://www.afdb.org/en/about-us/corporate-information/members/>

Ineligible Countries in reference to ITB 4.8 and ITB 5.1

In reference to ITB 4.8 and ITB 5.1, for the information of the Bidders, at the present time firms, goods and services from the following countries are excluded from this Bidding process:

Section IX - Particular Conditions of Contract

Except where otherwise specified, all Particular Conditions of Contract should be filled in by the Employer prior to issuance of the bidding document. Schedules and reports to be provided by the Employer should be annexed.

A. General	
GCC 1.1 (d) (i)	The financing institution is: African Development Bank
GCC 1.1 (d) (ii)	The Borrower is Government of Kenya
GCC 1.1 (r)	The Employer is Athi Water Works Development Agency.
GCC 1.1 (v)	Intended Completion Time 18 Months
GCC 1.1 (y)	The Project Manager is Chief Manager: Water and Sanitation Services Athi Water Works Development Agency
GCC 1.1 (aa)	The Site is located at Athi Water Works Development Agency Area of Jurisdiction.
GCC 1.1 (dd)	The Start Date shall be 28 days after Commencement Date
GCC 1.1 (hh)	The Works consist of Rain water harvesting activities, including; <ul style="list-style-type: none"> a) Ablution Blocks in the selected areas in selected informal settlements. b) Sewerage Networks and last mile household connections. c) Development of community Borehole based water supply projects with associated infrastructure
GCC 2.2	Sectional Completions are: Applicable.
GCC 2.3(i)	<p>The following documents also form part of the Contract:</p> <ul style="list-style-type: none"> (a) the Letter of Acceptance 215 (b) the Letter of Bid (c) the addenda Nos _____ (if any) (d) the Particular Conditions (e) the General Conditions of Contract, including appendix; (f) the Specification (g) the Drawings (h) Bill of Quantities;³⁴ and (i) any other document listed in the PCC as forming part of the Contract, but not limited to;

⁴⁴ In lump sum contracts, delete "Bill of Quantities" and replace with "Activity Schedule."

	<p>i. the ES Management Strategies and Implementation Plans; and</p> <p>ii. Code of Conduct for Contractor's Personnel (ES).</p>
GCC 3.1	<p>The language of the contract is English</p> <p>The law that applies to the Contract is the law of Kenyan</p>
GCC 5.1	The Project manager <i>may</i> delegate any of his duties and responsibilities.
GCC 13.1	<p>The minimum insurance amounts and deductibles shall be:</p> <p>(a) for loss or damage to the Works, Plant and Materials: Kshs 1,000,000</p> <p>(b) For loss or damage to Equipment: Kshs 2,000,000</p> <p>(c) for loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract Kshs 2,000,000</p> <p>(d) for personal injury or death:</p> <p>(i) of the Contractor's employees: Kshs 2,000,000</p> <p>(ii) of other people: Kshs 1,500,000</p>
GCC 20.1	The Site Possession Date(s) shall be: 28 days after Commencement Date.
GCC 23.1 & GCC 23.2	Appointing Authority for the Adjudicator: Chartered Institute of Arbitrators Kenya Chapter
GCC 24.3	Hourly rate and types of reimbursable expenses to be paid to the Adjudicator: Kshs 20,000
GCC 24.4	<p>Institution whose arbitration procedures shall be used: Chartered Institute of Arbitrators Kenya Chapter</p> <p><i>“Rules of Conciliation and Arbitration of the International Chamber of Commerce (ICC):</i></p> <p>All disputes arising in connection with the present Contract shall be finally settled under the Rules of Conciliation and Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with said Rules.”</p> <p>The place of arbitration shall be: Nairobi, Kenya.</p>
B. Time Control	
GCC 30.1	The Contractor shall submit for approval a Program for the Works within 28 days from the date of the Letter of Acceptance.

GCC 30.3	<p>The period between Program updates is 30 days.</p> <p>The amount to be withheld for late submission of an updated Program is Kshs 500,000</p> <p>The period for submission of progress reports is 30days.</p>
C. Quality Control	
GCC 38.1	The Defects Liability Period is: 365 days .
D. Cost Control	
GCC 42.7	If the value engineering proposal is approved by the Employer the amount to be paid to the Contractor shall be 25% of the reduction in the Contract Price.
GCC 48.1	The currency of the Employer's Country is: Kenyan Shillings .
GCC 49.1	The Contract is not subject to price adjustment in accordance with GCC Clause 49,
GCC 50.1	The proportion of payments retained is: 10%
GCC 51.1	The liquidated damages for the whole of the Works are 0.10% of the final Contract Price per day. The maximum amount of liquidated damages for the whole of the Works is 10% of the final Contract Price.
GCC 53.1	The Advance Payments shall be: 20% of total contract amounts (Against an unconditional Bank Guarantee of similar amounts)
GCC 54.1	The Performance Security amount will be in the form of Unconditional Bank Guarantee: in the amount(s) of 10% of the Accepted Contract Amount and in the same currency(ies) of the Accepted Contract Amount.
E. Finishing the Contract	
GCC 60.1	<p>The date by which operating and maintenance manuals are required is 30 Day after Project Completion.</p> <p>The date by which "as built" drawings are required is 30 Day after Project Completion.</p>
GCC 60.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required in GCC 60.1 is Kshs 500,000

Section X - Contract Forms

Table of Forms

Notification of Intention to Award	220
Beneficial Ownership Disclosure Form.....	224
Letter of Acceptance	226
Contract Agreement	227
Performance Security - Bank Guarantee.....	229
Performance Security - Performance Bond	231
Retention Money Security	235

Notification of Intention to Award

[This Notification of Intention to Award shall be sent to each Bidder that submitted a Bid.]

[Send this Notification to the Bidder's Authorized Representative named in the Bidder Information Form]

For the attention of Bidder's Authorized Representative

Name: *[insert Authorized Representative's name]*

Address: *[insert Authorized Representative's Address]*

Telephone/Fax numbers: *[insert Authorized Representative's telephone/fax numbers]*

Email Address: *[insert Authorized Representative's email address]*

[IMPORTANT: insert the date that this Notification is transmitted to Bidders. The Notification must be sent to all Bidders simultaneously. This means on the same date and as close to the same time as possible.]

Date of Transmission: This Notification is sent by: *[email/fax]* on *[date]* (local time)

Notification of Intention to Award

Employer: *[insert the name of the Employer]*

Project: *[insert name of project]*

Contract title: *[insert the name of the contract]*

Country: *[insert country where IFB is issued]*

Loan No. /Credit No. / Grant No.: *[insert reference number for loan/credit/grant]*

OCBI No: *[insert OCBI reference number from Procurement Plan]*

This Notification of Intention to Award (Notification) notifies you of our decision to award the above contract. The transmission of this Notification begins the Standstill Period. During the Standstill Period, you may:

- a) request a debriefing in relation to the evaluation of your Bid, and/or
- b) submit a Procurement-related Complaint in relation to the decision to award the contract.

1. The successful Bidder

Name:	[insert name of successful Bidder]
Address:	[insert address of the successful Bidder]
Contract price:	[insert contract price of the successful Bid]

2. Other Bidders *[INSTRUCTIONS: insert names of all Bidders that submitted a Bid. If the Bid's price was evaluated include the evaluated price as well as the Bid price as read out.]*

Name of Bidder	Bid price	Evaluated Bid price (if applicable)
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]

3. Reason/s why your Bid was unsuccessful

[INSTRUCTIONS: State the reason/s why this Bidder's Bid was unsuccessful. Do NOT include: (a) a point by point comparison with another Bidder's Bid or (b) information that is marked confidential by the Bidder in its Bid.]

4. How to request a debriefing

DEADLINE: The deadline to request a debriefing expires at midnight on [insert date] (local time).

You may request a debriefing in relation to the results of the evaluation of your Bid. If you decide to request a debriefing your written request must be made within three (3) Business Days of receipt of this Notification of Intention to Award.

Provide the contract name, reference number, name of the Bidder, contact details; and address the request for debriefing as follows:

Attention: [insert full name of person, if applicable]

Title/position: [insert title/position]

Agency: [insert name of Employer]

Email address: [insert email address]

Fax number: [insert fax number] *delete if not used*

If your request for a debriefing is received within the 3 Business Days deadline, we will provide the debriefing within five (5) Business Days of receipt of your request.

If we are unable to provide the debriefing within this period, the Standstill Period shall be extended by five (5) Business Days after the date that the debriefing is provided. If this happens, we will notify you and confirm the date that the extended Standstill Period will end.

The debriefing may be in writing, by phone, video conference call or in person. We shall promptly advise you in writing how the debriefing will take place and confirm the date and time.

If the deadline to request a debriefing has expired, you may still request a debriefing. In this case, we will provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of the Contract Award Notice.

5. How to make a complaint

Period: Procurement-related Complaint challenging the decision to award shall be submitted by midnight, [insert date] (local time).

Provide the contract name, reference number, name of the Bidder, contact details; and address the Procurement-related Complaint as follows:

Attention: *[insert full name of person, if applicable]*

Title/position: *[insert title/position]*

Agency: *[insert name of Employer]*

Email address: *[insert email address]*

Fax number: *[insert fax number] delete if not used*

At this point in the procurement process, you may submit a Procurement-related Complaint challenging the decision to award the contract. You do not need to have requested, or received, a debriefing before making this complaint. Your complaint must be submitted within the Standstill Period and received by us before the Standstill Period ends.

Further information:

For more information see the Bank's Procurement Framework

In summary, there are four essential requirements:

1. You must be an 'interested party'. In this case, that means a Bidder who submitted a Bid in this bidding process, and is the recipient of a Notification of Intention to Award.
2. The complaint can only challenge the decision to award the contract.
3. You must submit the complaint within the period stated above.
4. You must include, in your complaint, all of the information required by the Procurement Framework.

6. Standstill Period

DEADLINE: The Standstill Period is due to end at midnight on *[insert date]* (local time).

The Standstill Period lasts ten (10) Business Days after the date of transmission of this Notification of Intention to Award.

The Standstill Period may be extended as stated in Section 4 above.

If you have any questions regarding this Notification, please do not hesitate to contact us.

On behalf of the Employer:

Signature: _____

Name: _____

Title/position: _____

Telephone: _____

Email: _____

Beneficial Ownership Disclosure Form

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE FORM

This Beneficial Ownership Disclosure Form ("Form") is to be completed by the successful Bidder. In case of joint venture, the Bidder must submit a separate Form for each member. The beneficial ownership information to be submitted in this Form shall be current as of the date of its submission.

For the purposes of this Form, a Beneficial Owner of a Bidder is any natural person who ultimately owns or controls the Bidder by meeting one or more of the following conditions:

- *directly or indirectly holding 25% or more of the shares*
- *directly or indirectly holding 25% or more of the voting rights*
- *directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Bidder*

OCBI No.: *[insert number as per procurement plan]*

Invitation for Bid No.: *[insert identification]*

To: *[insert complete name of Employer]*

In response to your request in the Letter of Acceptance dated *[insert date of letter of Acceptance]* to furnish additional information on beneficial ownership: *[select one option as applicable and delete the options that are not applicable]*

(i) we hereby provide the following beneficial ownership information.

Details of beneficial ownership

Identity of Beneficial Owner	Directly or indirectly holding 25% or more of the shares (Yes / No)	Directly or indirectly holding 25 % or more of the Voting Rights (Yes / No)	Directly or indirectly having the right to appoint a majority of the board of the directors or an equivalent governing body of the Bidder (Yes / No)
<i>[include full name (last, middle, first), nationality, country of residence]</i>			

OR

(ii) *We declare that there is no Beneficial Owner meeting one or more of the following conditions:*

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Bidder

OR

(iii) *We declare that we are unable to identify any Beneficial Owner meeting one or more of the following conditions. [If this option is selected, the Bidder shall provide explanation on why it is unable to identify any Beneficial Owner]*

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Bidder]”

Name of the Bidder: **[insert complete name of the Bidder]*

Name of the person duly authorized to sign the Bid on behalf of the Bidder:
[insert complete name of person duly authorized to sign the Bid]

Title of the person signing the Bid:
[insert complete title of the person signing the Bid]

Signature of the person named above:
[insert signature of person whose name and capacity are shown above]

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

* In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder. In the event that the Bidder is a joint venture, each reference to “Bidder” in the Beneficial Ownership Disclosure Form (including this Introduction thereto) shall be read to refer to the joint venture member.

** Person signing the Bid shall have the power of attorney given by the Bidder. The power of attorney shall be attached with the Bid Schedules.

Letter of Acceptance

[date]

To: *[name and address of the Contractor]*

Subject: *[Notification of Award Contract No]*

This is to notify you that your Bid dated *[insert date]* for execution of the *[insert name of the contract and identification number, as given in the PCC]* for the Accepted Contract Amount of *[insert amount in numbers and words and name of currency]*, as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish (i) the Performance Security within 28 days in accordance with the Conditions of Contract, using for that purpose the of the Performance Security Form, included in Section X - Contract Forms, of the bidding document.

[Choose one of the following statements:]

We accept that _____ *[insert the name of Adjudicator proposed by the Bidder]* be appointed as the Adjudicator.

[or]

We do not accept that _____ *[insert the name of the Adjudicator proposed by the Bidder]* be appointed as the Adjudicator, and by sending a copy of this Letter of Acceptance to _____ *[insert name of the Appointing Authority]*, the Appointing Authority, we are hereby requesting such Authority to appoint the Adjudicator in accordance with ITB 48.1 and GCC 23.1.

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Attachment: Contract Agreement

Contract Agreement

THIS AGREEMENT made the day of,, between *[name of the Employer]* (hereinafter “the Employer”), of the one part, and *[name of the Contractor]* (hereinafter “the Contractor”), of the other part:

WHEREAS the Employer desires that the Works known as *[name of the Contract]*. should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
 - (j) the Letter of Acceptance
 - (k) the Letter of Bid
 - (l) the addenda Nos _____ (if any)
 - (m) the Particular Conditions
 - (n) the General Conditions of Contract, including appendix;
 - (o) the Specification
 - (p) the Drawings
 - (q) Bill of Quantities;³⁵ and
 - (r) any other document **listed in the PCC** as forming part of the Contract, but not limited to;
 - i. the ES Management Strategies and Implementation Plans; and
 - ii. Code of Conduct for Contractor’s Personnel (ES).
3. In consideration of the payments to be made by the Employer to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, 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.

227

⁴⁴ In lump sum contracts, delete “Bill of Quantities” and replace with “Activity Schedule.”

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of *[name of the borrowing country]*. . . .on the day, month and year specified above.

Signed by: _____

for and on behalf of the Employer

in the
presence of:

Witness, Name, Signature, Address, Date

Signed by: _____

for and on behalf the Contractor

in the
presence of:

Witness, Name, Signature, Address, Date

Performance Security - Bank Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[insert name and Address of Employer]*

Date: *[Insert date of issue]*

PERFORMANCE GUARANTEE No.: *[Insert guarantee reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that _ *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Applicant") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, 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 Applicant (name of the contractor) to issue this guarantee, we as (name of the bank) Guarantor, hereby irrevocably undertake to pay the Beneficiary (name of the employer) any sum or sums not exceeding in total an amount of *[insert amount in figures]* (_____) *[insert amount in words]*,¹ such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the Day of, 2...², and any demand for payment under it must be received by us at this office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

¹ The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency(cies) of the Contract or a freely convertible currency acceptable to the Beneficiary.

² Insert the date twenty-eight days after the expected completion date as described in GC Clause 1.1(v) and GCC 57.1. The Employer should note that in the event of an extension of this date for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

[signature(s)]

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

Performance Security - Performance Bond

By this Bond *[insert name of Principal]* as Principal (hereinafter called “the Contractor”) and *[insert name of Surety]* as Surety (hereinafter called “the Surety”), are held and firmly bound unto *[insert name of Employer]* as Obligee (hereinafter called “the Employer”) in the amount of *[insert amount in words and figures]* specified as the penal sum of this Bond, for the payment of which sum well and truly to be made in the types and proportions of currencies in which the Contract Price is payable, the Contractor and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Contractor has entered into a written Agreement with the Employer dated the _____ day of _____, 20____, for *[name of contract and brief description of Works]* in accordance with the documents, plans, specifications, and amendments thereto, which to the extent herein provided for, are by reference made part hereof and are hereinafter referred to as the Contract.

NOW, THEREFORE, the Condition of this Obligation is such that, if the Contractor shall promptly and faithfully perform the said Contract (including any amendments thereto), then this obligation shall be null and void; otherwise, it shall remain in full force and effect. Whenever the Contractor shall be, and declared by the Employer to be, in default under the Contract, the Employer having performed the Employer’s obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

- (1) complete the Contract in accordance with its terms and conditions; or
- (2) obtain a Bid or Bids from qualified Bidders for submission to the Employer for completing the Contract in accordance with its terms and conditions, and upon determination by the Employer and the Surety of the lowest responsive Bidder, arrange for a Contract between such Bidder and Employer and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the Balance of the Contract Price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the specified penal sum set forth in the first paragraph hereof. The term “Balance of the Contract Price,” as used in this paragraph, shall mean the total amount payable by Employer to Contractor under the Contract, less the amount properly paid by Employer to Contractor; or
- (3) pay the Employer the amount required by Employer to complete the Contract in accordance with its terms and conditions up to a total not exceeding the specified penal sum of this Bond.

The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

Any suit under this Bond must be instituted before the expiration of one year from the date of the issuing of the Taking-Over Certificate.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Employer named herein or the heirs, executors, administrators, successors, and assigns of the Employer.

In testimony whereof, the Contractor has hereunto set his hand and affixed his seal, and the Surety has caused these presents to be sealed with his corporate seal duly attested by the signature of his legal representative, this _____ day of _____ 20_____.
_____.

SIGNED ON _____ on behalf of

By _____ in the capacity of

In the presence of

SIGNED ON _____ on behalf of

By _____ in the capacity of

In the presence of

Advance Payment Security

Demand Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[Insert name and Address of Employer]*

Date: *[Insert date of issue]*

ADVANCE PAYMENT GUARANTEE No.: *[Insert guarantee reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Applicant") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, 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, an advance payment in the sum *[insert amount in figures]* () *[insert amount in words]* is to be made against an advance payment guarantee.

At the request of the Applicant to issue this guarantee, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]* (_____) *[insert amount in words]*¹ upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

- (a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or
- (b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number *[insert number]* at *[insert name and address of Applicant's bank]*..

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified 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 ninety (90) percent of the Accepted Contract Amount, less provisional sums, has been certified

¹ The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.

for payment, or on the *[insert day]* day of *[insert month]*, 2 *[insert year]*,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. This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

[signature(s)]

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

² Insert the expected expiration date of the Time for Completion keeping in view provisions under GCC 1.1 (v) and GCC 57.1. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

Retention Money Security

Demand Guarantee

_____ [Guarantor letterhead or SWIFT identifier code]
Beneficiary: _____ [Insert name and Address of Employer]
Date: _____ [Insert date of issue]
RETENTION MONEY GUARANTEE No.: _____ [Insert guarantee reference number]
Guarantor: [Insert name and address of place of issue, unless indicated in the letterhead]

We have been informed that _____ [insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture] (hereinafter called "the Applicant") has entered into Contract No. _____ [insert reference number of the contract] dated _____ with the Beneficiary, 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, the Beneficiary retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when the Taking-Over Certificate has been issued under the Contract and the first half of the Retention Money has been certified for payment, payment of [insert the second half of the Retention Money or if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money, the difference between half of the Retention Money and the amount guaranteed under the Performance Security and, if required, the ES Performance Security] is to be made against a Retention Money guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ [insert amount in figures] (_____) [amount in words]¹ upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the second half of the Retention Money as referred to above has been credited to the Applicant on its account number _____ at _____ [insert name and address of Applicant's bank].

¹ The Guarantor shall insert an amount representing the amount of the second half of the Retention Money and denominated either in the currency(ies) of the second half of the Retention Money as specified in the Contract, or in a freely convertible currency acceptable to the Beneficiary.

This guarantee shall expire no later than the Day of, 2...², and any demand for payment under it must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

[signature(s)]

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

² Insert the same expiry date representing the date twenty-eight days after the defect liability period described in GCC Clause 38.1 beyond the date of completion of whole of works. The Employer should note that in the event of an extension of this date for Intended completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."