

**NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY (NEMA)**



**TENDER DOCUMENT FOR FENCING WORKS
FOR ADAPTATION VILLAGES AND
CONSTRUCTION OF BASIC VILLAGE HALLS.**

TENDER NO. NEMA/T/23/2020-2021.

APRIL 2020.

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SECTION I

INVITATION FOR TENDERS

Tender reference No.: NEMA/T/23/2020-2021

Tender Name: FENCING WORKS FOR ADAPTATION VILLAGES AND CONSTRUCTION OF BASIC VILLAGE HALLS.

- 1.1 The National Environment Management Authority (NEMA) invites sealed tenders for Fencing Works for Adaptation Villages and Construction of Basic Village Halls. The works will involve site clearance, top soil stripping, excavation and strip footing as itemized in the Bill of Quantities. The tender for all the sites will be awarded as one contract to the lowest evaluated bidder. It is estimated that the construction period required to complete all the sites is six (6) months. The Sites are located at Kwale, Kitui, Garrisa, Wajir, Homabay, Kisumu, Machakos, Kajiado and Laikipia.
- 1.2 Interested eligible candidates may obtain further information and inspect tender documents and drawings at **NEMA Head Offices at Elland House, Ground Floor, Popo Road, South C, off Mombasa Road** during normal working hours (0800hrs-1700hrs) **Monday to Friday**.
- 1.3 A complete set of tender documents should be obtained for free by interested candidates from www.nema.go.ke or www.tenders.go.ke.
- 1.4 Prices quoted should be net inclusive of all taxes, must be in Kenya shillings and shall remain valid for **120 days** from the closing date of tender.
- 1.5 Completed tender documents are to be enclosed in plain sealed envelopes marked with Tender name and reference number and deposited in the Tender Box at **NEMA Head Offices at Elland House, Ground Floor, Popo Road, South C, off Mombasa Road** so as to be received on or before **4th May 2021 at 2:00PM**.
- 1.6 Tenders will be opened immediately thereafter in the presence of the candidates or their representatives who choose to attend at **NEMA Head Offices**.

Chief Procurement Officer

For (Accounting Officer/Procuring Entity)

SECTION II

INSTRUCTIONS TO TENDERERS

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INSTRUCTIONS TO TENDERERS.

1. General/Eligibility/Qualifications/Joint venture/Cost of tendering

- 1.1 The Employer as defined in the Appendix to Conditions of Contract invites tenders for Works Contract as described in the tender documents. The successful tenderer will be expected to complete the Works by the Intended Completion Date specified in the tender documents.
- 1.2 All tenderers shall provide the Qualification Information, a statement that the tenderer (including all members of a joint venture and subcontractors) is not associated, or has not been associated in the past, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the Works, and any of its affiliates, shall not be eligible to tender.
- 1.3 All tenderers shall provide in the Form of Tender and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary.
- 1.4 In the event that pre-qualification of potential tenderers has been undertaken, only tenders from pre-qualified tenderers will be considered for award of Contract. These qualified tenderers should submit with their tenders any information updating their original pre-qualification applications or, alternatively, confirm in their tenders that the originally submitted pre-qualification information remains essentially correct as of the date of tender submission.
- 1.5 Where no pre-qualification of potential tenderers has been done, all tenderers shall include the following information and documents with their tenders , unless otherwise stated:
 - (a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the tender to commit the tenderer:
 - (b) total monetary value of construction work performed for each of the last five years:
 - (c) experience in works of a similar nature and size for each of the last five years, and details of work under way or contractually committed; and names and addresses of clients who may be contacted for further information on these contracts;

- (d) Major items of construction equipment proposed to carry out the Contract and an undertaking that they will be available for the Contract.
- (e) Qualifications and experience of key site management and technical personnel proposed for the Contract and an undertaking that they shall be available for the Contract.
- (f) reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the past five years;
- (g) evidence of adequacy of working capital for this Contract (access to line(s) of credit and availability of other financial resources);
- (h) authority to seek references from the tenderer's bankers;
- (i) information regarding any litigation, current or during the last five years, in which the tenderer is involved, the parties concerned and disputed amount; and
- (j) Proposals for subcontracting components of the Works amounting to more than 10 percent of the Contract Price.

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

- (a) the tender shall include all the information listed in clause 1.5 above for each joint venture partner;
- (b) the tender shall be signed so as to be legally binding on all partners;
- (c) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
- (d) one of the partners will be nominated as being in charge, authorised to incur liabilities, and receive instructions for and on behalf of all partners of the joint venture; and
- (e) the execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.

1.7 To qualify for award of the Contract, tenderers shall meet the following minimum qualifying criteria;

- (a) annual volume of construction work of at least 2.5 times the estimated annual cashflow for the Contract;
- (b) experience as main contractor in the construction of at least
- (c) two works of a nature and complexity equivalent to the Works

over the last 10 years (to comply with this requirement, works cited should be at least 70 percent complete);

- (d) proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment listed as required for the Works;
 - (e) a Contract manager with at least five years' experience in works of an equivalent nature and volume, including no less than three years as Manager; and
 - (f) liquid assets and/or credit facilities, net of other contractual commitments and exclusive of any advance payments which may be made under the Contract, of no less than 4 months of the estimated payment flow under this Contract.
- 1.8 The figures for each of the partners of a joint venture shall be added together to determine the tenderer's compliance with the minimum qualifying criteria of clause 1.7 (a) and (e); however, for a joint venture to qualify, each of its partners must meet at least 25 percent of minimum criteria 1.7 (a), (b) and (e) for an individual tenderer, and the partner in charge at least 40 percent of those minimum criteria. Failure to comply with this requirement will result in rejection of the joint venture's tender. Subcontractors' experience and resources will not be taken into account in determining the tenderer's compliance with the qualifying criteria, unless otherwise stated.
- 1.9 Each tenderer shall submit only one tender, either individually or as a partner in a joint venture. A tenderer who submits or participates in more than one tender (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the tenderer's participation to be disqualified.
- 1.10 The tenderer shall bear all costs associated with the preparation and submission of his tender, and the Employer will in no case be responsible or liable for those costs.
- 1.11 The tenderer, at the tenderer's own responsibility and risk, is encouraged to visit and examine the Site of the Works and its surroundings, and obtain all information that may be necessary for preparing the tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the tenderer's own expense.
- 1.12 The procuring entity's employees, committee members, board members and their relative (spouse and children) are not eligible to participate in the tender.
- 1.13 The price to be charged for the tender document shall not exceed Kshs.5,000/=
- 1.14 The procuring entity shall allow the tenderer to review the tender document free of charge before purchase.

2. Tender Documents

- 2.1 The complete set of tender documents comprises the documents listed below and any addenda issued in accordance with Clause 2.4.
- (a) These Instructions to Tenderers
 - (b) Form of Tender and Qualification Information
 - (c) Conditions of Contract
 - (d) Appendix to Conditions of Contract
 - (e) Specifications
 - (f) Drawings
 - (g) Bills of Quantities
 - (h) Forms of Securities
- 2.2 The tenderer shall examine all Instructions, Forms to be filled and Specifications in the tender documents. Failure to furnish all information required by the tender documents, or submission of a tender not substantially responsive to the tendering documents in every respect will be at the tenderer's risk and may result in rejection of his tender.
- 2.3 A prospective tenderer making an inquiry relating to the tender documents may notify the Employer in writing or by cable, telex or facsimile at the address indicated in the letter of invitation to tender. The Employer will only respond to requests for clarification received earlier than seven days prior to the deadline for submission of tenders. Copies of the Employer's response will be forwarded to all persons issued with tendering documents, including a description of the inquiry, but without identifying its source.
- 2.4 Before the deadline for submission of tenders, the Employer may modify the tendering documents by issuing addenda. Any addendum thus issued shall be part of the tendering documents and shall be communicated in writing or by cable, telex or facsimile to all tenderers. Prospective tenderers shall acknowledge receipt of each addendum in writing to the Employer.
- 7
- 2.5 To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend, as necessary, the deadline for submission of tenders, in accordance with Clause 4.2 here below.

3. Preparation of Tenders

- 3.1 All documents relating to the tender and any correspondence shall be in English language.
- 3.2 The tender submitted by the tenderer shall comprise the following:
- (a) These Instructions to Tenderers, Form of Tender, Conditions of Contract, Appendix to Conditions of Contract and Specifications;

- (b) Tender Security;
 - (c) Priced Bill of Quantities ;
 - (d) Qualification Information Form and Documents;
 - (e) Alternative offers where invited; and
 - (f) Any other materials required to be completed and submitted by the tenderers.
- 3.3 The tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the tenderer will not be paid for when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities. All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause relevant to the Contract, as of 30 days prior to the deadline for submission of tenders, shall be included in the tender price submitted by the tenderer.
- 3.4 The rates and prices quoted by the tenderer shall only be subject to adjustment during the performance of the Contract if provided for in the Appendix to Conditions of Contract and provisions made in the Conditions of Contract.
- 3.5 The unit rates and prices shall be in Kenya Shillings.
- 3.6 Tenders shall remain valid for a period of sixty (60) days from the date of submission. However in exceptional circumstances, the Employer may request that the tenderers extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing. A tenderer may refuse the request without forfeiting the Tender Security. A tenderer agreeing to the request will not be required or permitted to otherwise modify the tender, but will be required to extend the validity of Tender Security for the period of the extension, and in compliance with Clause 3.7 - 3.11 in all respects.
- 3.7 The tenderer shall furnish, as part of the tender, a Tender Security in the amount and form specified in the appendix to invitation to tenderers. This shall be in the amount not exceeding 2 percent of the tender price
- 3.8 The format of the Tender Security should be in accordance with the form of Tender Security included in Section G - Standard forms or any other form acceptable to the Employer . Tender Security shall be valid for 30 days beyond the validity of the tender.
- 3.9 Any tender not accompanied by an acceptable Tender Security shall be rejected. The Tender Security of a joint venture must define as "Tenderer" all joint venture partners and list them in the following

manner: a joint venture consisting of".....", ".....", and ".....".

- 3.10 The Tender Securities of unsuccessful tenderers will be returned within 28 days of the end of the tender validity period specified in Clause 3.6.
- 3.11 The Tender Security of the successful tenderer will be discharged when the tenderer has signed the Contract Agreement and furnished the required Performance Security.
- 3.12 The Tender Security may be forfeited
- (a) if the tenderer withdraws the tender after tender opening during the period of tender validity;
 - (b) if the tenderer does not accept the correction of the tender price, pursuant to Clause 5.7;
 - (c) in the case of a successful tenderer, if the tenderer fails within the specified time limit to
 - (i) sign the Agreement, or
 - (ii) furnish the required Performance Security.
- 3.13 Tenderers shall submit offers that comply with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. Alternatives will not be considered, unless specifically allowed in the invitation to tender. If so allowed, tenderers wishing to offer technical alternatives to the requirements of the tendering documents must also submit a tender that complies with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. In addition to submitting the basic tender, the tenderer shall provide all information necessary for a complete evaluation of the alternative, including design calculations, technical specifications, breakdown of prices, proposed construction methods and other relevant details. Only the technical alternatives, if any, of the lowest evaluated tender conforming to the basic technical requirements shall be considered.
- 3.14 The tenderer shall prepare one original of the documents comprising the tender documents as described in Clause 3.2 of these Instructions to Tenderers, bound with the volume containing the Form of Tender, and clearly marked "ORIGINAL". In addition, the tenderer shall submit copies of the tender, in the number specified in the invitation to tender, and clearly marked as "COPIES". In the event of discrepancy between them, the original shall prevail.
- 3.15 The original and all copies of the tender shall be typed or written in indelible ink and shall be signed by a person or persons duly authorised

to sign on behalf of the tenderer, pursuant to Clause 1.5 (a) or 1.6 (b), as the case may be. All pages of the tender where alterations or additions have been made shall be initialled by the person or persons signing the tender.

- 3.16 Clarification of tenders shall be requested by the tenderer to be received by the procuring entity not later than 7 days prior to the deadline for submission of tenders.
- 3.17 The procuring entity shall reply to any clarifications sought by the tenderer within 3 days of receiving the request to enable the tenderer to make timely submission of its tender.
- 3.18 The tender security shall be in the amount of 0.5 – 2 per cent of the tender price.

4. Submission of Tenders

- 4.1 The tenderer shall seal the original and all copies of the tender in two inner envelopes and one outer envelope, duly marking the inner envelopes as “**ORIGINAL**” and “**COPIES**” as appropriate. The inner and outer envelopes shall:
 - (a) be addressed to the Employer at the address provided in the invitation to tender;
 - (b) bear the name and identification number of the Contract as defined in the invitation to tender; and
 - (c) provide a warning not to open before the specified time and date for tender opening.
- 4.2 Tenders shall be delivered to the Employer at the address specified above not later than the time and date specified in the invitation to tender. However, the Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Sub-Clause 2.5 in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline will then be subject to the new deadline.
- 4.3 Any tender received after the deadline prescribed in clause 4.2 will be returned to the tenderer un-opened.
- 4.4 Tenderers may modify or withdraw their tenders by giving notice in writing before the deadline prescribed in clause 4.2. Each tenderer’s modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with clause 3.13 and 4.1, with the outer and inner envelopes additionally marked “**MODIFICATION**” and “**WITHDRAWAL**”, as appropriate. No tender may be modified after the deadline for submission of tenders.

- 4.5 Withdrawal of a tender between the deadline for submission of tenders and the expiration of the period of tender validity specified in the invitation to tender or as extended pursuant to Clause 3.6 may result in the forfeiture of the Tender Security pursuant to Clause 3.11.
- 4.6 Tenderers may only offer discounts to, or otherwise modify the prices of their tenders by submitting tender modifications in accordance with Clause 4.4 or be included in the original tender submission.

5. Tender Opening and Evaluation

- 5.1 The tenders will be opened by the Employer, including modifications made pursuant to Clause 4.4, in the presence of the tenderers' representatives who choose to attend at the time and in the place specified in the invitation to tender. Envelopes marked "**WITHDRAWAL**" shall be opened and read out first. Tenderers' and Employer's representatives who are present during the opening shall sign a register evidencing their attendance.
- 5.2 The tenderers' names, the tender prices, the total amount of each tender and of any alternative tender (if alternatives have been requested or permitted), any discounts, tender modifications and withdrawals, the presence or absence of Tender Security, and such other details as may be considered appropriate, will be announced by the Employer at the opening. Minutes of the tender opening, including the information disclosed to those present will be prepared by the Employer.
- 5.3 Information relating to the examination, clarification, evaluation, and comparison of tenders and recommendations for the award of Contract shall not be disclosed to tenderers or any other persons not officially concerned with such process until the award to the successful tenderer has been announced. Any effort by a tenderer to influence the Employer's officials, processing of tenders or award decisions may result in the rejection of his tender.
- 5.4 To assist in the examination, evaluation, and comparison of tenders, the Employer at his discretion, may ask any tenderer for clarification of the tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, telex or facsimile but no change in the price or substance of the tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered in the evaluation of the tenders in accordance with Clause 5.7.
- 5.5 Prior to the detailed evaluation of tenders, the Employer will determine whether each tender (a) meets the eligibility criteria defined in Clause 1.7;(b) has been properly signed; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the tendering documents. A substantially responsive tender is one which conforms to all the terms, conditions and specifications of the tendering documents, without material deviation or

reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the works; (b) which limits in any substantial way, inconsistent with the tendering documents, the Employer's rights or the tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other tenderers presenting substantially responsive tenders.

- 5.6 If a tender is not substantially responsive, it will be rejected, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.
- 5.7 Tenders determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows:
- (a) where there is a discrepancy between the amount in figures and the amount in words, the amount in words will prevail; and
 - (b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will prevail, unless in the opinion of the Employer, there is an obvious typographical error, in which case the adjustment will be made to the entry containing that error.
 - (c) In the event of a discrepancy between the tender amount as stated in the Form of Tender and the corrected tender figure in the main summary of the Bill of Quantities, the amount as stated in the Form of Tender shall prevail.
 - (d) The Error Correction Factor shall be computed by expressing the difference between the tender amount and the corrected tender sum as a percentage of the corrected Builder's Work (i.e. Corrected tender sum less P.C. and Provisional Sums)
 - (e) The Error Correction Factor shall be applied to all Builder's Work (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.
 - (f) the amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and, with concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount, the tender may be rejected and the Tender Security may be forfeited in accordance with clause 3.11.
- 5.8 The Employer will evaluate and compare only the tenders determined to be substantially responsive in accordance with Clause 5.5.
- 5.9 In evaluating the tenders, the Employer will determine for each tender the evaluated tender price by adjusting the tender price as follows:
- (a) making any correction for errors pursuant to clause 5.7;

- (b) excluding provisional sums and the provision, if any, for contingencies in the Bill of Quantities, but including Day works where priced competitively.
 - (c) making an appropriate adjustment for any other acceptable variations, deviations, or alternative offers submitted in accordance with clause 3.12; and
 - (d) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with clause 4.6
- 5.10 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the tender documents or otherwise result in unsolicited benefits for the Employer will not be taken into account in tender evaluation.
- 5.11 The tenderer shall not influence the Employer on any matter relating to his tender from the time of the tender opening to the time the Contract is awarded. Any effort by the Tenderer to influence the Employer or his employees in his decision on tender evaluation, tender comparison or Contract award may result in the rejection of the tender.
- 5.12 Firms incorporated in Kenya where indigenous Kenyans own 51% or more of the share capital shall be allowed a 10% preferential bias provided that they do not sub-contract work valued at more than 50% of the Contract Price excluding Provisional Sums to a non-indigenous sub-contractor.

6. Award of Contract

- 6.1 Subject to Clause 6.2, the award of the Contract will be made to the tenderer whose tender has been determined to be substantially responsive to the tendering documents and who has offered the lowest evaluated tender price, provided that such tenderer has been determined to be (a) eligible in accordance with the provision of Clauses 1.2, and (b) qualified in accordance with the provisions of clause 1.7 and 1.8.
- 6.2 Notwithstanding clause 6.1 above, the Employer reserves the right to accept or reject any tender, and to cancel the tendering process and reject all tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected tenderer or tenderers or any obligation to inform the affected tenderer or tenderers of the grounds for the action.
- 6.3 The tenderer whose tender has been accepted will be notified of the award prior to expiration of the tender validity period in writing or by cable, telex or facsimile. This notification (hereinafter and in all Contract documents called the "Letter of Acceptance") will state the sum

(hereinafter and in all Contract documents called the "Contract Price") that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract. At the same time the other tenderers shall be informed that their tenders have not been successful.

The contract shall be formed on the parties signing the contract.

- 6.4 The Agreement will incorporate all agreements between the Employer and the successful tenderer. Within 14 days of receipt the successful tenderer will sign the Agreement and return it to the Employer.
- 6.5 Within 21 days after receipt of the Letter of Acceptance, the successful tenderer shall deliver to the Employer a Performance Security in the amount stipulated in the Appendix to Conditions of Contract and in the form stipulated in the Tender documents. The Performance Security shall be in the amount and specified form
- 6.6 Failure of the successful tenderer to comply with the requirements of clause 6.5 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Tender Security.
- 6.7 Upon the furnishing by the successful tenderer of the Performance Security, the Employer will promptly notify the other tenderers that their tenders have been unsuccessful.
- 6.8 Preference where allowed in the evaluation of tenders shall not be allowed for contracts not exceeding one year (12 months).
- 6.9 The tender evaluation committee shall evaluate the tender within 30 days of the validity period from the date of opening the tender.
- 6.10 The parties to the contract shall have it signed within 30 days from the date of notification of contract award unless there is an administrative review request.
- 6.11 Contract price variations shall not be allowed for contracts not exceeding one year (12 months)
- 6.12 Where contract price variation is allowed, the valuation shall not exceed 15% of the original contract price.
- 6.13 Price variation request shall be processed by the procuring entity within 30 days of receiving the request.
- 6.14 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination.

6.15 The procuring entity shall give prompt notice of the termination to the tenderers and on request give its reasons for termination within 14 days of receiving the request from any tenderer.

6.16 A tenderer who gives false information in the tender document about its qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.

7. Corrupt and Fraudulent practices

7.1 The procuring entity requires that tenderers observe the highest standards of ethics during procurement process and execution of contracts. A tenderer shall sign a declaration that he has not and will not be involved in corrupt and fraudulent practices.

APPENDIX TO INSTRUCTIONS TO TENDERERS

Clause

1.13 A complete set of tender documents should be obtained for free by interested candidates from www.nema.go.ke or www.tenders.go.ke .

3.7 & 3.18 The tenderer security shall not be required.

5.5 & 5.8 The following evaluation criteria shall be applied notwithstanding any other requirement in the tender document:

Stage I: Pre-liminary Evaluation

a) Mandatory Requirements

ALL the following requirements **MUST** be met by the tenderer:

No	Requirement	Provided	Not provided
1	Copy of Certificate of Incorporation/ Business Registration		
2	Copy of Form CR12 from the Registrar of Companies not older than 12 months for Limited Companies		
3	Copy of VALID KRA Tax Compliance Certificate		
4	Copy of Valid NCA 6 Certificate or Higher for Building Works		
5	Legible copies of Identification documents for directors (IDs/passports)		
6	Single Business Permit for the office premises from the County Government		

NB:

At this stage the tenderer's submission will either be responsive or non-responsive. The non-responsive submissions will be eliminated from the entire evaluation process and will not be considered further.

Stage II: Technical Evaluation (PASS MARK 70%)**Summary sheet**

Scoring criteria			Bidder's Score
	Description	Maxim Possible Score	
1	Experience / Works of similar nature	33	
2	Equipment for the works	26	
3	Staff Competence (Technical)	21	
4	Evidence of financial capability for the work	20	
TOTAL		100	

NB:

This section will be scored out of 100 points and will determine the technical score. The Pass mark is 70/100. Bidders who score below this will not progress to Financial Evaluation.

1.0 EXPERIENCE /WORKS OF SIMILAR NATURE (Attach Evidence e.g. Completion Certificates, Contracts) (33)

Schedule 1.1 (equal or higher values) max score (12)

Criteria	Maximum Points Possible	Bidder's score	Remarks
Three projects of equal or higher value in the last five years.	12 - (@ 4)		
Any three projects of value between 50-99% of value of works in the last five years	6 - (@ 2)		
Any three projects less than 50% value of the tendered works in the last five years	3 - (@1)		
MAX SUB-TOTAL SCORE	12		

Note :

- Score awarded will be in line with the Bidder submitting documents which conform to the requirements above.
- Only one score will be provided as per the submissions.

3. The highest score attained will be allotted as per the submissions in accordance to the above.
4. The score will be prorated based on the three largest projects of the contractor within the last five years.

Schedule 1.2 (Similar nature) max score (15)

Criteria	Maximum Points Possible	Bidder's Score	Remarks
Three projects of similar nature and complexity combining the majority of the major elements under this tender – (bidder to detail and clearly display similarity of proposed works to their experience) in the last 5 years.	15 – (@ 5)		
Any Three projects of similar nature but not same complexity	9 – (@ 3)		
Any three other unrelated construction works and installation works	6 – (@ 2)		
MAX SUB-TOTAL SCORE	15		

Note :

1. Score awarded will be in line with the Bidder submitting requirements which conform to the requirements above.
2. Only one score will be provided as per the submissions.
3. The highest score attained will be allotted as per the submissions in accordance to the above.
4. The score will be prorated based on the three most similar projects of the contractor.

Schedule 1.3 (reference and clients) max score (6)

Criteria	Maximum Points Possible	Bidder's Score	Remarks
Three or more similar works satisfactorily completed for National or County Governments or their agencies	6 – (@ 2)		
Three or more similar works satisfactorily completed for licensed NGOs and International Missions e.g. UN	3 – (@ 1)		
Works for other Clients	2		
MAX SUB-TOTAL SCORE	6		

Note :

1. Score awarded will be in line with the Bidder submitting requirements which conform to the requirements above.
2. Only one score will be provided as per the submissions.
3. The highest score attained will be allotted as per the submissions in accordance to the above.

2.0 CONTRACTORS EQUIPMENT (26)

Schedule 2.1- Equipment, availability and ownership score (13)

	Equipment	No. Required	Owned @Each	Leased @Each	Bidder Score	Remarks
1	Excavator / Backhoe	2	2	1		
2	10 Tonne Lorry	2	1	0.5		
3	1 tonne Pick Up	4	0.5	0.125		
4	Water Bowser	2	0.5	0.25		
5	Concrete Mixer	4	0.25	0.125		
6	Poker vibrator	8	0.125	0.07		
7	Welding Machine	2	0.5	0.25		
8	Rammers /Compactor	4	0.25	0.125		

Schedule 2.2 age of equipment score (13)

Plant type required		Score per item				Bidder's Score	Remarks
		1-8 years	8-10 years old	Over 10 years	Over 15 years		
1	2 No. Excavator	3	2	1	0		
2	2 No 10 Ton Lorries	2	1	0.5	0		
3	2 No Water bowser	2	1	0.5	0		
4	4 No Pickup 1 Ton	2	1	0.5	0		
5	4 No. Concrete Mixer	1	0.5	0.25	0		
6	8 no. Poker Vibrators	1	0.5	0.25	0		
7	2 No. Welding machines	1	0.5	0.25	0		
8	4 No. Rammers / Compactors	1	0.5	0.25	0		
MAX SUB-TOTAL SCORE		13					
NB: Log book and ownership documents must bear the name of the Company or Directors. Provide Certified copies for owned equipment.							

Note:

1. If number available is less than required prorate for the line accordingly.
2. Schedule of all equipment proposed to be used for these works should be Submitted.
3. Proof of certificates of ownership in form of Log Book Copies, Log Books held by Banking and Credit institutions stating the equipment is hire purchased by the contractor or agreements made for Lease with copies of the Log Books of the intended equipment for hire must be provided -failure to do so will attract a zero score.
4. All equipment listed must be, as a minimum, in good condition, and this will be confirmed by due diligence checks if deemed necessary.

3.0 STAFF max score (21)

Schedule 3.1- Availability and education score (11)

Key staff required	No. required	Maximum score for Educational qualification – Score per person		Bidder's score	Remarks
		Degree	Diploma		
<i>Management (Key personnel should be registered with relevant bodies e.g. EBK) – Doc. Should also be certified</i>					
<i>Project Engineer/Manager (Civil Engineer, Architect or Qs) Registered eg With EBK, KETRB</i>	1	2	1		
<i>Ass. Engineer (Civil-any building trade)</i>	1	1	0.5		
MAX SUB-TOTAL SCORE		3			

Supervisory	No. require	Maximum score for Educational qualification – Score per person			Bidder's Score	Remarks
		Degree	Diploma	Certificate		
Site agent (Civil or building any trade)	1	2	1	0		
Foreman 1 (Civil or building any trade) (NCA Accredited)	4	2	1	1		
Ass. Foreman (related to civil & Building etc.)	4	1	1	1		
MAX SUB-TOTAL SCORE		5				

Artisans	No. require	Maximum score for Educational qualification – Score per person	Bidder's Score	Remarks
Masons (NCA Registered)	8	0.125		
Welders	4	0.25		
Plant Operators	2	0.25		
Other support staff (Admin.- Storekeeper, Secretary, Accountant, etc.)	5	0.1		
MAX SUB-TOTAL SCORE		3		
MAX TOTAL OF ALL STAFF	15			

Schedule 3.2 Experience score (10)

Key staff required	No. required	Maximum score for experience in construction industry – Score per person						Bidder's score	Remarks
		Over 10 years		3-10 years		Up to 3 years			
		Relevant experience	General experience	Relevant experience	General experience	Relevant experience	General Experience		
<i>Project Engineer/manager</i>	1	3	2	2	1	1	0		
<i>Ass. Engineer (Civil-any building trade)</i>	1	1		0.5		0.5			
Supervisory									
<i>Site agent (Civil or building any trade)</i>	1	3	2	2	1	1	0		
<i>Foreman 1 (Civil or building any trade)</i>	4	1		0.5		0.25			
<i>Ass. Foreman</i>	4	1		0.5		0.25			
Artisans									
<i>Masons</i>	8	0.25		0.25		0.125			
<i>Welders</i>	4	0.25		0.25		0.125			
<i>Plant Operators</i>	2	0.25		0.25		0.125			
<i>Other support staff</i>	5	0.25		0.25		0.125			
MAX SUB-TOTAL SCORE		10							

Note:

1. If number available is less than required prorate for the line, proof of certificates and registration with professional body must be attached.
2. If no experience the line is scored zero. Proof of CV with references must be provided.
3. Total for each bidder for 3.1 and 3.2 transferred to summary sheet.
4. If number available is less than required then prorate for the line, proof of certificates and registration with professional body must be attached.

4.0 EVIDENCE OF FINANCIAL CAPACITY (20)

Schedule 4.1 Available records score (5)

Financial Record Provided	Maximum score	Bidder's Score	Remarks
Provide audited accounts for year – 2020	1		
Provide audited accounts for year – 2019	1		
Provide audited accounts for year – 2018	1		
Provide bank statements (6 months to date)	1		
Provide letter of credit (bank/supplier)	1		
<i>MAX SUB-TOTAL SCORE (Certified by Credible Audit firm)</i>	5		

Schedule 4.2 Amount in record compared to value of work score (15)

Financial capability (from financial statements)	Maximum score for financial capacity					Bidder's Score	Remarks
	Equal or over	75% to 99%	50% to 74%	25% to 50%	Less than 25%		
Value of gross turn over three times the value of tendered work in last three years	5	3.5	2.5	1	0.5		
Value of assets to tendered works	5	3.5	2.5	1	0.5		
Value of credit line available to tendered works value	5	3.5	2.5	1	0.5		
MAX SUB-TOTAL SCORE	15						

Note: Only Tenderers scoring 70% and above of the total technical score (stage two) shall proceed to stage three for Financial Evaluation.

STAGE III: FINANCIAL EVALUATION

The tenderer with the lowest evaluated financial price will be recommended for award of the contract.

SECTION III
CONDITIONS OF CONTRACT

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CONDITIONS OF CONTRACT

1. Definitions

1.1 In this Contract, except where context otherwise requires, the following terms shall be interpreted as indicated;

“Bill of Quantities” means the priced and completed Bill of Quantities forming part of the tender.

“Compensation Events” are those defined in Clause 24 hereunder.

“The Completion Date” means the date of completion of the Works as certified by the Project Manager, in accordance with Clause 31.

“The Contract” means the agreement entered into between the Employer and the Contractor as recorded in the Agreement Form and signed by the parties including all attachments and appendices thereto and all documents incorporated by reference therein to execute, complete, and maintain the Works,

“The Contractor” refers to the person or corporate body whose tender to carry out the Works has been accepted by the Employer.

“The Contractor’s Tender” is the completed tendering document submitted by the Contractor to the Employer.

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

“Days” are calendar days; **“Months”** are calendar months.

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

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

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

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

“Day works” are Work inputs subject to payment on a time basis for labour and the associated materials and plant.

“Employer”, or the **“Procuring entity”** as defined in the Public Procurement Regulations (i.e. Central or Local Government administration,

Universities, Public Institutions and Corporations, etc) is the party who employs the Contractor to carry out the Works.

“Equipment” is the Contractor’s machinery and vehicles brought temporarily to the Site for the execution of the Works.

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

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

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

“Project Manager” is the person named in the Appendix to Conditions of Contract (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 and shall be an “Architect” or a “Quantity Surveyor” registered under the Architects and Quantity Surveyors Act Cap 525 or an “Engineer” registered under Engineers Registration Act Cap 530.

“Site” is the area defined as such in the Appendix to Condition of Contract.

“Site Investigation Reports” are those reports that may be included in the tendering documents which are factual and interpretative about the surface and subsurface conditions at the Site.

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

“Start Date” is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with the Site possession date(s).

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

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

“A Variation” is an instruction given by the Project Manager which varies the Works.

“The Works” are what the Contract requires the Contractor to construct, install, and turnover to the Employer, as defined in the Appendix to Conditions of Contract.

2. Interpretation

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

2.2 If sectional completion is specified in the Appendix to Conditions of Contract, reference in the Conditions of Contract to the Works, the Completion Date and the Intended Completion Date apply to any section of the Works (other than references to the Intended Completion Date for the whole of the Works).

2.3 The following documents shall constitute the Contract documents and shall be interpreted in the following order of priority;

- (1) Agreement,
- (2) Letter of Acceptance,
- (3) Contractor’s Tender,
- (4) Appendix to Conditions of Contract,
- (5) Conditions of Contract,
- (6) Specifications,
- (7) Drawings,
- (8) Bill of Quantities,
- (9) Any other documents listed in the Appendix to Conditions of Contract as forming part of the Contract.

Immediately after the execution of the Contract, the Project Manager shall furnish both the Employer and the Contractor with two copies each of all the Contract documents. Further, as and when necessary the Project Manager shall furnish the Contractor [always with a copy to the Employer] with three [3] copies of such further drawings or details or descriptive schedules as are reasonably necessary either to explain or amplify the Contract drawings or to enable the

Contractor to carry out and complete the Works in accordance with these Conditions.

3. Language and Law

3.1 Language of the Contract and the law governing the Contract shall be English language and the Laws of Kenya respectively unless otherwise stated.

4 Project Manager's Decisions

4.1 Except where otherwise specifically stated, the Project Manager will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5 Delegation

5.1 The Project Manager may delegate any of his duties and responsibilities to others after notifying the Contractor.

6 Communications

6.1 Communication between parties shall be effective only when in writing. A notice shall be effective only when it is delivered.

7 Subcontracting

7.1 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.

8 Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities etc. as listed in the Appendix to Conditions of Contract and also with the Employer, as per the directions of the Project Manager. The Contractor shall also provide facilities and services for them. The Employer may modify the said List of Other Contractors etc., and shall notify the Contractor of any such modification.

9 Personnel

9.1 The Contractor shall employ the key personnel named in the Qualification Information, to carry out the functions stated in the said Information or other personnel approved by the Project Manager. The Project Manager will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Qualification Information. If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall

ensure that the person leaves the Site within seven days and has no further connection with the Work in the Contract.

10 Works

- 10.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings. The Works may commence on the Start Date and shall be carried out 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.

11 Safety and Temporary Works

- 11.1 The Contractor shall be responsible for the design of temporary works. However before erecting the same, he shall submit his designs including specifications and drawings to the Project Manager and to any other relevant third parties for their approval. No erection of temporary works shall be done until such approvals are obtained.
- 11.2 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary works and all drawings prepared by the Contractor for the execution of the temporary or permanent Works, shall be subject to prior approval by the Project Manager before they can be used.
- 11.3 The Contractor shall be responsible for the safety of all activities on the Site.

12. Discoveries

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

13. Work Program

- 13.1 Within the time stated in the Appendix to Conditions of Contract, 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. An update of the program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining Work, including any changes to the sequence of the activities.

The Contractor shall submit to the Project Manager for approval an updated program at intervals no longer than the period stated in the Appendix to Conditions of Contract. If the Contractor does not submit an updated program within this period, the Project Manager

may withhold the amount stated in the said Appendix 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. 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.

14. Possession of Site

14.1 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 Appendix to Conditions of Contract, the Employer will be deemed to have delayed the start of the relevant activities, and this will be a Compensation Event.

15. Access to Site

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

16. Instructions

16.1 The Contractor shall carry out all instructions of the Project Manager which are in accordance with the Contract.

17. Extension or Acceleration of Completion Date

17.1 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. 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 in writing 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 caused by such failure shall not be considered in assessing the new (extended) Completion Date.

17.2 No bonus for early completion of the Works shall be paid to the Contractor by the Employer.

18. Management Meetings

- 18.1 A Contract management meeting shall be held monthly and attended by the Project Manager and the Contractor. Its business shall be to review the plans for the remaining Work and to deal with matters raised in accordance with the early warning procedure. The Project Manager shall record the minutes of management meetings and provide copies of the same to those attending the meeting and 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.

19. Early Warning

- 19.1 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.
- 19.2 The Contractor shall cooperate with the Project Manager in making and considering proposals on 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 instructions of the Project Manager.

20. Defects

- 20.1 The Project Manager shall inspect the Contractor's work and notify the Contractor of any defects that are found. Such inspection 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. Should the defect be found, the cost of uncovering and making good shall be borne by the Contractor, However, if there is no defect found, the cost of uncovering and making good shall be treated as a variation and added to the Contract Price.
- 20.2 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 Appendix to Conditions of Contract. The Defects Liability Period shall be extended for as long as defects remain to be corrected.
- 20.3 Every time notice of a defect is given, the Contractor shall correct the notified defect within the length of time specified by the Project Manager's notice. If the Contractor has not corrected a defect within the time specified in the Project Manager's notice, the Project Manager will assess the cost of having the defect corrected by other parties and such cost shall be treated as a variation and be deducted from the Contract Price.

21. Bills Of Quantities

- 21.1 The Bills of Quantities shall contain items for the construction, installation, testing and commissioning of the Work to be done by the Contractor. The Contractor will be paid for the quantity of the Work done at the rate in the Bills of Quantities for each item.
- 21.2 If the final quantity of the Work done differs from the quantity in the Bills of Quantities for the particular item by more than 25 percent and provided the change exceeds 1 percent of the Initial Contract price, the Project Manager shall adjust the rate to allow for the change.
- 21.3 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bills of Quantities.

22. Variations

- 22.1 All variations shall be included in updated programs produced by the Contractor.
- 22.2 The Contractor shall provide the Project Manager with a quotation for carrying out the variations when requested to do so. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period as may be stated by the Project Manager and before the Variation is ordered.
- 22.3 If the work in the variation corresponds with an item description in the Bills of Quantities and if in the opinion of the Project Manager, the quantity of work is not above the limit stated in Clause 21.2 or the timing of its execution does not cause the cost per unit of quantity to change, the rate in the Bills of Quantities shall be used to calculate the value of the variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the variation does not correspond with items in the Bills of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of Work.
- 22.4 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.
- 22.5 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.

- 22.6 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.
- 22.7 When the Program is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast.

23. Payment Certificates, Currency of Payments and Advance Payments

- 23.1 The Contractor shall submit to the Project Manager monthly applications for payment giving sufficient details of the Work done and materials on Site and the amounts which the Contractor considers himself to be entitled to. The Project Manager shall check the monthly application and certify the amount to be paid to the Contractor within 14 days. The value of Work executed and payable shall be determined by the Project Manager.
- 23.2 The value of Work executed shall comprise the value of the quantities of the items in the Bills of Quantities completed, materials delivered on Site, variations and compensation events. Such materials shall become the property of the Employer once the Employer has paid the Contractor for their value. Thereafter, they shall not be removed from Site without the Project Manager's instructions except for use upon the Works.
- 23.3 Payments shall be adjusted for deductions for retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of issue of each certificate. If the Employer makes a late payment, the Contractor shall be paid simple interest on the late payment in the next payment. Interest shall be calculated on the basis of number of days delayed at a rate three percentage points above the Central Bank of Kenya's average rate for base lending prevailing as of the first day the payment becomes overdue.
- 23.4 If an amount certified is increased in a later certificate or as a result of an award by 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.
- 23.5 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.
- 23.6 The Contract Price shall be stated in Kenya Shillings. All payments to the Contractor shall be made in Kenya Shillings and foreign currency in the proportion indicated in the tender, or agreed prior to the execution of the Contract Agreement and indicated therein. The rate of exchange for the calculation of the amount of foreign currency payment shall be the rate of exchange indicated in the Appendix to Conditions of Contract. If the Contractor indicated foreign currencies for payment other than the currencies of the countries of origin of related goods and services the Employer reserves the right to pay the equivalent at the time of payment in

the currencies of the countries of such goods and services. The Employer and the Project Manager shall be notified promptly by the Contractor of any changes in the expected foreign currency requirements of the Contractor during the execution of the Works as indicated in the Schedule of Foreign Currency Requirements and the foreign and local currency portions of the balance of the Contract Price shall then be amended by agreement between Employer and the Contractor in order to reflect appropriately such changes.

23.7 In the event that an advance payment is granted, the following shall apply:-

- a) On signature of the Contract, the Contractor shall at his request, and without furnishing proof of expenditure, be entitled to an advance of 10% (ten percent) of the original amount of the Contract. The advance shall not be subject to retention money.
- b) No advance payment may be made before the Contractor has submitted proof of the establishment of deposit or a directly liable guarantee satisfactory to the Employer in the amount of the advance payment. The guarantee shall be in the same currency as the advance.
- c) Reimbursement of the lump sum advance shall be made by deductions from the Interim payments and where applicable from the balance owing to the Contractor. Reimbursement shall begin when the amount of the sums due under the Contract reaches 20% of the original amount of the Contract. It shall have been completed by the time 80% of this amount is reached.

The amount to be repaid by way of successive deductions shall be calculated by means of the formula:

$$R = \frac{A(x^1 - x^{11})}{80 - 20}$$

Where:

- R = the amount to be reimbursed
- A = the amount of the advance which has been granted
- X¹ = the amount of proposed cumulative payments as a percentage of the original amount of the Contract. This figure will exceed 20% but not exceed 80%.
- X¹¹ = the amount of the previous cumulative payments as a percentage of the original amount of the Contract. This figure will be below 80% but not less than 20%.
- d) with each reimbursement the counterpart of the directly liable guarantee may be reduced accordingly.

24. Compensation Events

24.1 The following issues shall constitute Compensation Events:

- (a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Appendix to Conditions of Contract.
- (b) The Employer modifies the List of Other Contractors, etc., 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 the Work, which is then found to have no defects.
- (e) The Project Manager unreasonably does not approve a subcontract to be let.
- (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to tenderers (including the Site investigation reports), from information available publicly and from a visual inspection of the Site.
- (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the 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 effects on the Contractor of any of the Employer's risks.
- (j) The Project Manager unreasonably delays issuing a Certificate of Completion.
- (k) Other compensation events described in the Contract or determined by the Project Manager shall apply.

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

- 24.3 As soon as information demonstrating the effect of each compensation event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager will assume that the Contractor will react competently and promptly to the event.
- 24.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having co-operated with the Project Manager.
- 24.5 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the Appendix to Conditions of Contract.
- 24.6 The Contractor shall give written notice to the Project Manager of his intention to make a claim within thirty days after the event giving rise to the claim has first arisen. The claim shall be submitted within thirty days thereafter.

Provided always that should the event giving rise to the claim of continuing effect, the Contractor shall submit an interim claim within the said thirty days and a final claim within thirty days of the end of the event giving rise to the claim.

25. Price Adjustment

- 25.1 The Project Manager shall adjust the Contract Price if taxes, duties and other levies are changed between the date 30 days before the submission of tenders for the Contract and the date of Completion. The adjustment shall be the change in the amount of tax payable by the Contractor.
- 25.2 The Contract Price shall be deemed to be based on exchange rates current at the date of tender submission in calculating the cost to the Contractor of materials to be specifically imported (by express provisions in the Contract Bills of Quantities or Specifications) for permanent incorporation in the Works. Unless otherwise stated in the Contract, if at any time during the period of the Contract exchange rates shall be varied and this shall affect the cost to the Contractor of such materials, then the Project Manager shall assess the net difference in the cost of such materials. Any amount from time to time so assessed shall be added to or deducted from the Contract Price, as the case may be.
- 25.3 Unless otherwise stated in the Contract, the Contract Price shall be deemed to have been calculated in the manner set out below and in sub-clauses 25.4 and 25.5 and shall be subject to adjustment in the events specified thereunder;

- (i) The prices contained in the Contract Bills of Quantities shall be deemed to be based upon the rates of wages and other emoluments and expenses as determined by the Joint Building Council of Kenya (J.B.C.) and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.
 - (ii) Upon J.B.C. determining that any of the said rates of wages or other emoluments and expenses are increased or decreased, then the Contract Price shall be increased or decreased by the amount assessed by the Project Manager based upon the difference, expressed as a percentage, between the rate set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of labour incorporated within the amount of Work remaining to be executed at the date of publication of such increase or decrease.
 - (iii) No adjustment shall be made in respect of changes in the rates of wages and other emoluments and expenses which occur after the date of Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.
- 25.4 The prices contained in the Contract Bills of Quantities shall be deemed to be based upon the basic prices of materials to be permanently incorporated in the Works as determined by the J.B.C. and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.
- 25.5 Upon the J.B.C. determining that any of the said basic prices are increased or decreased then the Contract Price shall be increased or decreased by the amount to be assessed by the Project Manager based upon the difference between the price set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of the relevant materials which have not been taken into account in arriving at the amount of any interim certificate under clause 23 of these Conditions issued before the date of publication of such increase or decrease.
- 25.6 No adjustment shall be made in respect of changes in basic prices of materials which occur after the date for Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.
- 25.7 The provisions of sub-clause 25.1 to 25.2 herein shall not apply in respect of any materials included in the schedule of basic rates.

26. Retention

26.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the Appendix to Conditions of Contract until Completion of the whole of the Works. On Completion of the whole of the Works, half the total amount retained shall be repaid to the Contractor and the remaining half when the Defects Liability Period has passed and the Project Manager has certified that all defects notified to the Contractor before the end of this period have been corrected.

27. Liquidated Damages

27.1 The Contractor shall pay liquidated damages to the Employer at the rate stated in the Appendix to Conditions of Contract for each day that the actual Completion Date is later than the Intended Completion Date. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not alter the Contractor's liabilities.

27.2 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 rate specified in Clause 23.30

28. Securities

28.1 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 and form and by a reputable bank acceptable to the Employer, and denominated in Kenya Shillings. The Performance Security shall be valid until a date 30 days beyond the date of issue of the Certificate of Completion.

29. Dayworks

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

29.2 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.

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

30. Liability and Insurance

30.1 From the Start Date until the Defects Correction Certificate has been issued, the following are the 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 Employer's design, or due to war or radioactive contamination directly affecting the place where the Works are being executed.

30.2 From the Completion Date until the Defects Correction Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is the Employer's risk except loss or damage due to;

- (a) a defect which existed on or before the Completion Date.
- (b) an event occurring before the Completion Date, which was not itself the Employer's risk
- (c) the activities of the Contractor on the Site after the Completion Date.

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

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 stated in the Appendix to Conditions of Contract for the following events;

- (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.

30.4 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 required to rectify the loss or damage incurred.

- 30.5 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 from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.
- 30.6 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager. Both parties shall comply with any conditions of insurance policies.

31. Completion and taking over

- 31.1 Upon deciding that the Works are complete, the Contractor shall issue a written request to the Project Manager to issue a Certificate of Completion of the Works. The Employer shall take over the Site and the Works within seven [7] days of the Project Manager's issuing a Certificate of Completion.

32. Final Account

- 32.1 The Contractor shall issue the Project Manager with a detailed account of the total amount that the Contractor considers payable to him by the Employer 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 30 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 30 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. The Employer shall pay the Contractor the amount due in the Final Certificate within 60 days.

33. Termination

- 33.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. These

fundamental breaches of Contract shall include, but shall not be limited to, the following;

- (a) the Contractor stops work for 30 days when no stoppage of work is shown on the current program and the stoppage has not been authorised 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 30 days;

- (c) the Contractor is declared 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 30 days (for Interim Certificate) or 60 days (for Final Certificate) of issue.
 - (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.
- 33.2 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 Clause 33.1 above, the Project Manager shall decide whether the breach is fundamental or not.
- 33.3 Notwithstanding the above, the Employer may terminate the Contract for convenience.
- 33.4 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. The Project Manager shall immediately thereafter arrange for a meeting for the purpose of taking record of the Works executed and materials, goods, equipment and temporary buildings on Site.

34. Payment Upon Termination

- 34.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the Work done and materials ordered and delivered to Site up to the date of the issue of the certificate. Additional liquidated damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable by the Contractor.
- 34.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the Work done, materials ordered, the reasonable cost of removal of equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works.
- 34.3 The Employer may employ and pay other persons to carry out and complete the Works and to rectify any defects and may enter upon the Works and use all materials on the Site, plant, equipment and temporary works.

34.4 The Contractor shall, during the execution or after the completion of the Works under this clause remove from the Site as and when required, within such reasonable time as the Project Manager may in writing specify, any temporary buildings, plant, machinery, appliances, goods or materials belonging to or hired by him, and in default the Employer may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, holding the proceeds less all costs incurred to the credit of the Contractor.

Until after completion of the Works under this clause the Employer shall not be bound by any other provision of this Contract to make any payment to the Contractor, but upon such completion as aforesaid and the verification within a reasonable time of the accounts therefore the Project Manager shall certify the amount of expenses properly incurred by the Employer and, if such amount added to the money paid to the Contractor before such determination exceeds the total amount which would have been payable on due completion in accordance with this Contract the difference shall be a debt payable to the Employer by the Contractor; and if the said amount added to the said money be less than the said total amount, the difference shall be a debt payable by the Employer to the Contractor.

35. Release from Performance

35.1 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.

36. Corrupt gifts and payments of commission

The Contractor shall not;

(a) Offer or give or agree to give to any person in the service of the

Employer any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other Contract for the Employer or for showing or forbearing to show favour or disfavour to any person in relation to this or any other contract for the Employer.

(b) Enter into this or any other contract with the Employer in connection with which commission has been paid or agreed to be paid by him or on his behalf or to his knowledge, unless before the Contract is made particulars of any such commission and of the terms and conditions of any agreement for the payment thereof have been disclosed in writing to the Employer.

Any breach of this Condition by the Contractor or by anyone employed by him or acting on his behalf (whether with or without the knowledge of the Contractor) shall be an offence under the provisions of the Public Procurement Regulations issued under The Exchequer and Audit Act Cap 412 of the Laws of Kenya.

37. Settlement Of Disputes

37.1 In case any dispute or difference shall arise between the Employer or the Project Manager on his behalf and the Contractor, either during the progress or after the completion or termination of the Works, such dispute shall be notified in writing by either party to the other with a request to submit it to arbitration and to concur in the appointment of an Arbitrator within thirty days of the notice. The dispute shall be referred to the arbitration and final decision of a person to be agreed between the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointed by the Chairman or Vice Chairman of any of the following professional institutions;

- (i) Architectural Association of Kenya
- (ii) Institute of Quantity Surveyors of Kenya
- (iii) Association of Consulting Engineers of Kenya
- (iv) Chartered Institute of Arbitrators (Kenya Branch)
- (v) Institution of Engineers of Kenya

On the request of the applying party. The institution written to first by the aggrieved party shall take precedence over all other institutions.

37.2 The arbitration may be on the construction of this Contract or on any matter or thing of whatsoever nature arising thereunder or in connection therewith, including any matter or thing left by this Contract to the discretion of the Project Manager, or the withholding by the Project Manager of any certificate to which the Contractor may claim to be entitled to or the measurement and valuation referred to in clause 23.0 of these conditions, or the rights and liabilities of the parties subsequent to the termination of Contract.

37.3 Provided that no arbitration proceedings shall be commenced on any dispute or difference where notice of a dispute or difference has not been given by the applying party within ninety days of the occurrence or discovery of the matter or issue giving rise to the dispute.

37.4 Notwithstanding the issue of a notice as stated above, the arbitration of such a dispute or difference shall not commence unless an attempt has in the first instance been made by the parties to settle such dispute or

difference amicably with or without the assistance of third parties. Proof of such attempt shall be required.

37.5 Notwithstanding anything stated herein the following matters may be referred to arbitration before the practical completion of the Works or abandonment of the Works or termination of the Contract by either party:

37.5.1 The appointment of a replacement Project Manager upon the said person ceasing to act.

37.5.2 Whether or not the issue of an instruction by the Project Manager is empowered by these Conditions.

37.5.3 Whether or not a certificate has been improperly withheld or is not in accordance with these Conditions.

37.5.4 Any dispute or difference arising in respect of war risks or war damage.

37.6 All other matters shall only be referred to arbitration after the completion or alleged completion of the Works or termination or alleged termination of the Contract, unless the Employer and the Contractor agree otherwise in writing.

37.7 The Arbitrator shall, without prejudice to the generality of his powers, have powers to direct such measurements, computations, tests or valuations as may in his opinion be desirable in order to determine the rights of the parties and assess and award any sums which ought to have been the subject of or included in any certificate.

37.8 The Arbitrator shall, without prejudice to the generality of his powers, have powers to open up, review and revise any certificate, opinion, decision, requirement or notice and to determine all matters in dispute which shall be submitted to him in the same manner as if no such certificate, opinion, decision requirement or notice had been given.

37.9 The award of such Arbitrator shall be final and binding upon the parties.

SECTION IV – APPENDIX TO CONDITIONS OF CONTRACT

THE EMPLOYER IS

Name: The National Environment Management Authority

Address: P.O.BOX: 67839-00200, Nairobi.

Name of Authorised Representative: Director General

Telephone: 020-2101370, 020-2183718, 020-2307281, 020-2103696

Mobile: 0724 253398, 0735 013046, 0723 363 010

Email: dgnema@nema.go.ke

The Project Manager is

Name: Eng. Martin Murimi Nderi

Address: P.O.BOX: 67839-00200, Nairobi.

Telephone: 020-2101370, 020-2183718, 020-2307281, 020-2103696

Mobile: 0724 253398, 0735 013046, 0723 363 010

Email: MNderi@nema.go.ke

The name (and identification number) of the Contract is “**Construction and Fencing of Basic Training Halls.**”

The Works *consist of site clearance, top soil stripping, excavation and strip footing as itemized in the Bill of Quantities.*

The Start Date shall be the date of instruction to commence works.

The Intended Completion Date for the whole of the Works shall be 180 days from the instruction to commence works

The Contractor shall submit a revised program for the Works Not later than 21 days after issuance of Order to Commence.

The Site Possession Date shall be within 21 days after signing the contract.

The Site is located at Kwale, Kitui, Garrisa, Wajir, Homabay, Kisumu, Machakos, Kajiado and Laikipia and is defined in drawings nos.1 to 6

The Defects Liability period is 6 Months.

The minimum insurance covers shall be;

The minimum cover for insurance of the Works and of Plant and Materials in respect of the Contractor's faulty design is Ksh. 10,000,000

The minimum cover for loss or damage to Equipment is Ksh.10,000,000

The minimum for insurance of other property is Ksh. 2, 000,000

The minimum cover for personal injury or death insurance

For the Contractor's employees is Ksh. 2,000,000

And for other people is Ksh. 5,000,000

The following events shall also be Compensation Events as per Clause of the general conditions of contract.

The period between Program updates is 90 days.

The amount to be withheld for late submission of an updated Program is value of monthly certificate

The proportion of payments retained is 10 percent.

The Price Adjustment Clause _____N/A_____ (shall/shall not) apply

The liquidated damages for the whole of the Works is Kshs.10,000 (per day)

The Performance Security shall be for the following minimum amounts equivalent as a percentage of the Contract Price six (6) percent (%).

The Completion Period for the Works is 30 Weeks.

The rate of exchange for calculation of foreign currency payments is _____N/A_____.

The schedule of basic rates used in pricing by the Contractor is as attached [Contractor to attach].

Advance Payment 20% shall/ shall not be granted upon receipt of Advance Payment Guarantee.

SECTION V - SPECIFICATIONS

Description of Works And Location

This tender is for the construction fencing works and basic villages halls of the proposed Adaptation villages. Adaptation Villages are community based centres established as training and technology transfer centres on Climate Change Adaptation. These adaptation villages currently have water harvesting assets, mostly solarized boreholes and a community water point. The project sites are located in Kwale, Kitui, Garissa, Wajir, Machakos, Laikipia, Kajiado, Homabay and Kisumu Counties.

Extent of the Works

The works to be executed under this Contract comprises:

- i. Fencing works in 20 Adaptation Village sites
- ii. Construction of 20 basic village halls

Provision of equipment material and labor

The Contractor shall provide all equipment, transport, materials and labour necessary for the satisfactory completion of the works in compliance with the specifications herein. The Engineer reserves the right to inspect plant and materials prior to Contractor selection, and may reject plant or material that in his/her opinion is substandard or inappropriate. The Contractor shall provide full descriptions of all plants to be deployed for these works. The Contractor shall present method statements describing in detail the proposed approach to work.

The Contractor shall provide summary detail of the experience of key personnel to be deployed for these works.

Occupation of site

The Employer will provide land on which the works shall be constructed. The Contractor shall be given possession of such parts of the site that he requires for activities related to construction works including storage of raw materials, equipment. The Contractor shall not enter upon or occupy with men, tools, equipment and materials any land other than the land or right of way provided by the Employer

Diligent performance

The Contractor shall at all times perform the Works diligently and in accordance with sound professional practice. He/she shall not proceed from one stage of works to another without the express permission of the Engineer.

Decisions regarding temporary halt, discontinuing of any element or part of any element of these works, or abandonment of these works, shall be discussed jointly between the Contractor and the Engineer before any further actions are authorized by the Engineer. The Engineer's decision shall be final.

The Engineer will require a written submission justifying any steps taken by the successful bidder without the Engineer's approval. An unsatisfactory explanation shall lead to non-payment for works undertaken without prior agreement, and may be included for consideration as liquidated damages.

Drawings

The project drawings shall comprise

- a. The drawings provided in volume V issued for Tender
- b. Such other drawings and/or sketches as are issued from time to time by the Engineer to deal with design modifications in response to on-site conditions.

Record drawing

As the work proceeds the Contractor shall markup „As Built“ details on a set of prints of the Contract Drawings modified to portray the works as actually constructed and issue to the Engineer's representatives for approval within 7 days of completion of the works covered by each drawing.

Level datum

It shall be the responsibility of the Contractor before commencing work to obtain from the Engineer in writing the values and locations of the benchmarks to be used in these works. All temporary benchmarks shall be referred thereto.

The Contractor shall construct such temporary benchmarks as the Engineer may direct and shall agree the levels thereof with the Engineer. The establishment of such

temporary benchmarks shall be deemed part of the Contractor's responsibility in setting out the works.

The reduced levels are shown on the drawing are believed but not guaranteed to be correct. In the event of any discrepancies between the drawing and the specification, the specification shall have precedence over the drawing.

Setting out

The Contractor shall appoint and employ the necessary qualified and experienced staff to set out the works accurately.

The Contractor shall establish and locate all lines and levels and be responsible for the correct location of all works.

Where directed by the Engineer, the Contractor shall take such levels and dimensions as may be required for the purposes of measurement before disturbance of the ground. These shall be agreed between the Contractor and the Engineer in writing before any ground surface is disturbed or covered up. Any work commenced without taking the said levels and dimensions shall be measured on the Engineer's reckoning of their values before disturbance. The Engineer's decision on this matter shall be final.

Construction and checking of work

The Contractor shall be solely responsible for and shall provide all labour, tools, lifting tackle, and other equipment required for the construction and checking of the works. No operative shall be allowed to execute any type of work which is normally carried out by a skilled trade's man, unless the operative is thoroughly experienced and proficient in the trade concerned. Supervisors and operatives may be required to demonstrate their proficiency or produce certificates of competence to the satisfaction of the Engineer.

As each part of the work is carried out, it shall be subject to the approval of the Engineer

Office for Engineer

The Contractor is required to provide the Office within 4 weeks for Engineer's Representative from the date of Commencement of Work.

The Office shall be of a design and construction approved by the Engineer and shall be constructed of strong, durable and weather proof materials with walls, ceilings and

floors adequately insulated against heat and cold. The Office shall have a floor area of at least 30 square metres, and shall be provided with equipment and furniture detailed under the following clauses. The floor shall be concrete float finish and shall be at least 200mm above surrounding ground level.

The Office shall have burglar proofing to all windows and external doors. The Resident Engineer's Office shall be separate from the Contractor's Yard and shall be situated in a compound fenced with 1.5m chain link fence on cedar posts complete with gate including padlock and chain. Hard-standing and access drives (not exceeding 20% of the area of the compound) shall be provided within the compound and constructed with murrum or other stable road making materials. The areas so provided shall be shaped to falls to provide adequate drainage and incidental kerbing and outfall drainage shall be provided where necessary, a lean-to corrugated iron shelter shall be provided as covered parking. All equipment and furnishings detailed under this Clause shall be provided by the Contractor. All the equipment and furnishings will revert to the Employer at the end of the Contract.

The Contractor shall arrange for the provision of airtime for the exclusive use of the Engineer's Representative and his Staff. The Contractor shall include in the sum for provision of the Office Equipment and Furnishings. Provision shall also be made by the Contractor for all necessary gas, electricity, kerosene, water, light, attendance and stationery required in connection with execution of the Contract. The Engineer's Representative's Office shall be regularly and properly cleaned to the satisfaction of the Resident Engineer. A messenger and tea boy / office cleaner shall be provided by the Contractor exclusively for the Engineer's Office. Security Guards shall be provided for day and night security at this Office. The Office, furniture and equipment shall be insured against fire, theft and natural calamity.

Provision for Engineer's Office

The offices shall be suitably furnished with the following as minimum requirements (all shall revert to the employer at the end of Project):

<u>Furniture / Equipment</u>	<u>Quantity</u>
Writing Desk without Locks	2 Nr
High Back Chairs with arm rests	2 Nr
Wooden Conference Table, 2.0m x 1.2m	1 Nr
Office chairs without arm rests	6 Nr

Visitors Chairs without arm rests	3 Nr
Lockable Steel Cupboard (Size 1m x 1.8m x 0.5m deep)	1 Nr
Office paper punch	2 Nr
Pin board 2.4m x 1.2m	1Nr
Office Tray (3 tier)	2 Nr
Heavy Duty Stapler	1 Nr
'Casio' or similar small portable electronic calculator 1 Nr	1 Nr
First Aid kit (for 10 persons) in Metal Box	1 Nr
Small office scissor	1Nr

Wastepaper baskets	3Nr
Electric kettle (capacity 1.8 litres) 1	1Nr
Coffee/Tea making facility including crockery for all supervisory staff 4 Nr. and 8 additional guests	1 Nr
Wooden book shelves 2.0m x 1.5m 1 Nr	1Nr
Laptop – “DELL” Latitude 155000 Series, E5540 Intel Core i5 4200U (1.6 to 2.6 GHz, 4th Generation) Processor, 8GB DDR3L, Memory 500GB (5,400Rpm) SATA HDD, 15.6” Antiglare LED Backlit, DVD +/- RW, Integrated Full HD Camera with Microphone, INTEL 4400 HD on Board Graphic Card, Bluetooth, WLAN, Primary 6-cell 65W/HR LI-ION, Windows 8.1 Professional.	1Nr
Printer / Photocopier / Scanning Machine – Nashua Tec Model MPC 205/AO 20 Pages per minute, B/W and Colour, A3/A4 Size Paper or approved equivalent. Include for maintenance contract for the duration of the Contract.	1 Nr
Stand-alone A4 Laser Printer HP or approved equivalent	1 Nr
Wall Clock	1 Nr
Flashlights (battery powered)	2 Nr

Digital Camera (Sony or approved equivalent)	1 Nr
USB Flash Disk, 32GB and above	1 Nr
External Hard Disk Drive, 500GB and above	1 Nr

Maintenance and Attendance to the Engineer's Office

Stationery required per month is as follows (Stationery to be approved every month by the Resident Engineer before ordering):

Stationery	Quantity
Photocopy paper A4	1 Ream
Photocopy paper A3	1 Ream
Biro pens blue/black	½ Doz
Clutch Pencils	2 Nr
Box files	4 Nr
Spiral files	½ Doz
Document Wallets	2Nr
Spirals (various sizes of Reports)	½ Doz
Embossed (hardback cover)	½ Doz
Perspex covers	½ Doz
Cellotape (medium)	1No
Masking tape (medium)	1No
Staples.	2Pkt
Paper clips (various sizes)	2Pkt
C-DR (Pack of 12)	1Pkt
Pencil leads(0.5/0.7)	1 Set
Highlighters (set of all colours)	1 Set
A4 hardcover notebooks	2Nr
A6 hardcover notebooks	2Nr
Soft Pencil Erasers (Staedtler or equivalent) 1 Nr	2Nr
A4 Carbon papers	1 Doz
Batteries for flashlights	2 Set
Black ink cartridge/ toner for the A4 printer	1Set
Colour and Black ink cartridges for the A3 printer	1Set

In addition, the Contractor to supply clean towels, soap, lavatory paper, disinfectant and cleaning materials, coffee/tea, milk, sugar, drinking water, refreshments, etc. These items are to be provided and maintained throughout the Contract Period, adequate for 2 Supervision Staff and 8 additional guests. The List of Provisions and Consumables to be given by the Resident Engineer every month.

The Contractor will also be responsible for the following services for each office:

- i) Payment for all services including water, electricity, Airtime and Internet;
- ii) Guarding of the premises (24 hour security services);
- iii) Maintaining insurance against theft of equipment and other materials from the offices;
- iv) Service, maintain / repair office equipment and appliances;

The cost of all the above services shall be included by the Contractor under the relevant items in Bill No. 1 – Preliminaries and General for Maintenance and Attendance for the Resident Engineer's Offices. Apart from the consumables, the rest of the office and equipment will revert to the Employer at the end of the Contract.

Secretary / Office Assistant

The Contractor shall maintain a Secretary/Office for the exclusive use of the Resident Engineer for the duration of the Contract. The Secretary shall be English speaking, with a minimum 5 years' experience in secretarial / office administration work. The Secretary shall be conversant with standard office computer hardware and software (MS-Word, Excel, PowerPoint, etc). The Secretary shall be interviewed and tested by the Resident Engineer prior to deployment on the Works.

The Secretary/Office Assistant is to be paid by the Contractor (including NSSF, NHIF, etc) but will report directly to the Resident Engineer for day to day instructions. (messenger / tea boy / office cleaner) shall also be provided by the Contractor exclusively for the Resident Engineer's Office.

Project Supervision Vehicle

The Contractor shall service and maintain the vehicle to be used for supervision of the Contract by the Resident Engineer and his staff. The vehicle shall be provided by the employer. The Contractor shall ensure that the vehicle is serviced and maintained in good condition to the satisfaction of the Resident Engineer or his authorized representative so that the Resident Engineer shall at all times have the vehicle available for use in good serviceable condition. In the event of the vehicles being unserviceable for whatsoever reason, the Contractor shall provide an alternative vehicle at his own cost of the same model in compliance with the provisions of this clause. The cost for such replacement vehicle shall be covered by his rates. Payments for maintenance shall include for provision of fuels, lubricants and tyres, all regular maintenance, minor and major repairs, including those occasioned by accidental damage from whatever cause

arising, and everything else necessary to satisfy fully the requirements of this Clause. The vehicles will revert back to the Employer at the end of the Contract.

Survey Equipment

Listed below are the principal items of survey equipment to be made available for exclusive use by the Resident Engineer during the whole duration of Project Implementation. All equipment shall be as new and with all necessary carrying containers, manuals, insurances, etc. The Equipment to revert to Contractor at completion of all Works.

Equipment	Quantity
Automatic Level (Wild or Similar) with tripod legs and metric staff, complete with carrying case	1Nr
3 metre ranging rods	6Nr
Hard hats	3 Sets
5 metre retractable pocket steel tapes	1Nr
30 metre metal tapes	1Nr
100 metre metal tapes	1Nr
Hammer 3kg	1Nr

The Contractor shall also supply pegs, crayons, spray paint, nails and all other items required for setting out and measuring the work.

The Contractor shall provide the services of a Surveyor and two Chainmen as and when requested for the sole use of the Resident Engineer and Engineer’s Representative for the whole period of the Contract.

The cost for provision of the above for use of the Resident Engineer is deemed to be covered in the Bidder’s Rates.

Survey equipment

The Contractor shall provide for the sole use of the Engineers representative the survey equipment and appliance and these shall revert to the Contractor upon completion of the Contract.

The Contractor shall provide all labor and materials as may be required by the Engineer representative for survey work in connection with works.

Maintain Survey/ Field Equipment

The Contractor shall be responsible for maintaining the survey and field equipment throughout the Contract Period, including replacement of items damaged during the normal course of the Works.

The Contractor shall provide all such labour and assistance as may be required by the Engineer for checking the Contractor's setting out and/or survey.

The Contractor shall make available such labour, materials, equipment and consumables as the Engineer may require from time to time, for inspections and tests in connection with the Works

Supervision and labor

The Contractor will be required to maintain a competent supervising engineer and staff on Site throughout the construction period until completion of the works, and thereafter as may be required during the Defects Liability Period. The Engineer shall give prior approval to the appointment of this supervising engineer and shall have the authority to withdraw this approval at any time in accordance with the Conditions of Contract.

All staff and labour employed on the works shall be employed in accordance with the labour and employment laws and regulations of the Republic of Kenya

Contractor's site offices

The Contractor shall advise the Engineer at which of his offices any notices may be served in accordance with the Conditions of Contract.

Language of correspondence and records

All communication from Contractor to the Engineer and the Engineer's Representative shall be in English language.

All site books, time sheets, records, notes drawings, documents, specifications etc. shall be in English language

Contractor's duty staff & offices

At least one responsible senior representative of the Contractor shall be immediately available at all times and he shall be on site during normal working hours.

To such representative shall be delegated full authority to confer with Engineer's Representatives or his deputy and to take all steps and to issue all those instructions

which may be required in an emergency to ensure the safety of all personnel of the works and of all the Employer's and other property on the site and in the immediate vicinity thereof. The Engineer's Representative may from time to time at his discretion after taking into consideration all the prevailing conditions allow some relaxation of this clause but such relaxation shall be made only with his written permission and subject to any special conditions which he may then require.

The Contractor shall provide and maintain at the site, offices for the use of representative and to which written instructions by the Engineer's Representative can be delivered. Any instructions delivered to such offices shall be deemed to have been delivered to the Contractor.

Accommodation for workmen

Where the Contractor wishes to construct camp to accommodate his labour, the following requirements shall be adhered to and shall also be subject to the requirement made by the Relevant Government Administration or any local Authority.

Demolition of Contractor's temporary structures

The Engineer may at any time before the end of the period of maintenance give the Contractor notice in writing to demolish and remove those buildings and works which are no longer required, whereupon the title to such buildings and works and materials connected therewith shall revert to the Contractor. After the demolition and removal of building and works as required by the Engineer and Contractor shall level, clear, restore and make good the sites and surrounding ground and fill in and compact all latrines, drains, pits and similar works leaving the satisfaction of the Engineer's Representative.

Public Relations

The Contractor shall designate within his site organization competent staff whose responsibility shall be to ensure good relations.

The location of all yards, stores, workshops, offices, etc. shall be agreed beforehand with the Engineer's Representatives and shall be such as to avoid obstruction and nuisance to public and/or the client.

The Contractor shall provide and maintain at or near the site suitable and sufficient shelters, mess rooms, washrooms, latrines etc. as are necessary and customary, to the

satisfaction of the Engineer and in accordance with the law and regulations of the relevant authorities.

Definition and use of the Site

Definition of the Site

The Site shall include all those areas of land which, being public or private:

- Areas being provided by the Employer for the construction of the permanent works.
- Areas
- Being provided by the Employer for temporary works, including camps, offices and stores.

Are acquired, leased, or operated by the Contractor as borrow pits or spoil tips for the permanent works, including all access roads.

Use of the Site

Access to the Site is gained from public and private roads. The Contractor shall be responsible for cleaning and maintaining all existing roads affected by his work while he is on Site. He shall also be responsible for repairing and making good any damage to these roads. If the Contractor, his Sub -Contractors or suppliers, causes the damage, then the repairs will be at his own cost.

The Contractor shall be responsible for the construction, maintenance and repair of any temporary Site roads.

The lands and other places outside the Site, which are the property of or under the control of the Employer, shall not be used except with the approval of the Engineer.

The Contractor shall promptly remove any vehicle, wagon, barge or vessel or any other obstruction under his control, which the Engineer may require to be moved for any purpose. The Contractor shall remove such obstruction promptly upon receiving such instruction and at his own cost, unless the Engineer shall decide otherwise.

The Contractor shall maintain access for the inspection, operation and maintenance of any of the Employer's assets within the Site or elsewhere.

The Contractor shall not use any portion of the Site for any purpose not connected with the works unless the written permission of the Engineer has been obtained.

Possession of the Site

The Contractor shall restrict his activities to those areas of the Site adjacent to the works being executed and shall avoid any encroachment upon lands outside the areas for which possession has been given. Any trespass or damage or any claim arising from such encroachment shall be the Contractor's sole responsibility and he shall hold the Employer indemnified against all claims arising from such trespass or damage.

Interference with existing works

The Contractor shall not interfere in any way, with any existing works, be it the property of the Employer or of a third party, whether such works has been shown to the Contractor by the Engineer, except where such interference is specifically described as part of the works, either in the Contract or in instructions from the Engineer to take over such works.

Maintenance of natural environment

Disfigurement of the natural environment of the area during construction must be kept to a minimum and special care shall be taken to avoid permanent damage. Needless adverse effects on the local ecology shall be avoided. Bushes and trees shall not be cut except where necessary for the execution of the Works, and then only after the sanction of the Engineer has been obtained.

The Engineer shall have authority to require removal from the Project of any personnel who willfully neglect these matters.

Quality of Materials and Workmanship

All materials shall comply with the appropriate Standard Specifications and to the approval of the Engineer unless otherwise required hereinafter.

The Contractor, shall, before placing any order of materials, manufactured articles or machinery for incorporation in the works, submit for the approval of the Engineer the names of the suppliers from whom he proposes to obtain such materials, manufactured articles or machinery, together with a list of the same, giving the origin, quality, weight, strength, description and other relevant details. No materials, manufactured articles or

machinery shall be ordered or obtained from any suppliers not approved in writing by the Engineer.

All materials shall be delivered to the Site a sufficient period of time before they are required for use in the works, to enable the Engineer to take such samples as he may wish for testing and approval.

Notwithstanding the fact that approval has been given to the source of supply, the Engineer may forbid the use of any materials if, upon delivery, they are found to be defective, or he considers them unsuitable for incorporation in the works. Such rejected materials shall be removed from the site forthwith.

The Contractor may propose alternative materials of equivalent quality to those specified, and subject to the Engineer's approval, such materials may be used in the works.

The Contractor shall have no claim against the Employer in respect of any financial loss which he may suffer as a result of the rejection of any such materials, and he shall also bear the cost of removing them from the Site.

The Engineer shall have the right to inspect materials and plant for the permanent works during the course of manufacture. The Contractor shall arrange for the right of access to manufacturing premises for the Engineer and his staff during normal working hours. The Contractor shall give the Engineer sufficient notice to allow him to observe the testing of any materials for the works at the place of manufacture. The Engineer shall also be given the opportunity to inspect any material or plant in their completed state before packing for transport to the site.

If requested by the Engineer, the Contractor shall provide the Engineer with copies of orders for the supply of goods or materials required for the works.

Rejected materials and defective work

Materials or work which, in the opinion of the Engineer, do not comply with the Specification, shall be classified as rejected materials or defective work, and shall be cut out and removed from the works and replaced as directed by the Engineer.

Alternatives

The Contractor's main Bid shall comply fully with the Specification.

The Contractor is however at liberty to include alternative materials, items of Plant or methods of construction for which he claims advantages to those indicated in the

Specification and Drawings, provided the modes of operation and methods of construction are fully described and are at least equal to those shown on the Drawings or Implied in the Specification.

The Contractor shall submit manufacturer's detailed descriptions of alternatives and he shall draw attention to any aspect of each component that does not fully comply with the requirements of this Specification. These detailed descriptions, including any departure from the requirements of the Specification may, after approval by the Engineer, be included among the Contract documents and each item shall be in accordance with the description of it. Approval of a manufacturer's description shall not include approval of any departure from the requirements of the Specification unless the Engineer in writing specifically approves the departure.

Where materials, Plant or methods of construction differ from those specified, the Contractor shall submit with his Bid drawings showing any amendments of system design necessary to suit the alternative. The Engineer will either approve these drawings or issue others if he approves the components concerned.

The Engineer however, may not necessarily accept any alternative put forward. Existing works and services

The Contractor shall acquaint himself with the positions of all existing works before any excavation is commenced. He will be held responsible for any damage, however caused, in the course of the execution of the works, to such existing works and services. Any damage caused shall be made good at the Contractor's expense.

Such existing works and services, where exposed by the execution of the works, shall be properly shored, hung-up and supported to the satisfaction of the Engineer and of the authority concerned. The Contractor shall exercise special care when refilling trenches or other excavations around such existing services. Stop cock boxes, water meters and the like shall not be covered up.

Poles supporting cables and the like adjacent to the works shall be kept securely in place until the works are completed and shall then be made as safe and permanent as before.

Notwithstanding the foregoing requirements and without lessening the Contractor's responsibility, the Contractor shall inform the Engineer immediately any existing works have been exposed and shall comply with any requirements of the authority concerned.

Only when and as directed by the Engineer shall the position of existing works or services be changed by the Contractor to meet the requirements of the proposed work.

The Contractor shall make adequate provision so that when carrying out his work, no interference, damage or pollution is caused to highways and footpaths, or to any mains, drains, sewers, and the like or other parts of the works.

Wherever loads have to be carried over ground in which pipes, valves, culverts, and the like are buried, the Contractor shall take all precautions including where necessary, the provision and use of sleepered roads, light gauge railways or other means to prevent damage occurring to such underground works.

The Contractor shall not store any plant or materials or spoil heaps over existing water mains, or in such positions that interference with access to the mains, control valves and the like is created. Approval by the Engineer to the means of protection employed shall not relieve the Contractor of any responsibility in respect of damage occasioned by his operations.

The laying of pipe work, ducts, drains and the like shall be arranged so as to cause as little disruption, to traffic or public movement as possible with the smooth operation of existing works.

When breaking out and making good existing structures, the Contractor shall disturb the existing structures as little as possible. All structures shall be made good with materials similar to those used in the existing works, or such materials which are considered by the Engineer to be of similar appearance and suitable in all other respects.

Overhead power lines

Where work is being carried out in the vicinity of overhead power lines, the Contractor shall be responsible for ensuring that all persons working in such areas are aware of the safe working distances in the vicinity of high voltage overhead power lines especially when cranes or other large masses of steel are in the vicinity of the power lines.

The Contractor's attention is drawn to BS 162, which gives safe clearance for various voltages.

The Contractor shall take all necessary precautions to ensure the safety of his employees and all other persons where work is being carried out near overhead power lines.

Existing access

Existing access to lands, property and all other places shall be maintained by the Contractor for the duration of the works to the Engineer's satisfaction.

Excavation across roads and tracks

Before excavating across any public or private road or track, the Contractor shall give the Engineer ten days notice of his attention to excavate and shall include, in writing, the precautions he proposes to take for the continuance of passage and safety of traffic, and details of the warning signs and lights to be provided and operated. The excavation shall not commence until the written approval of the Engineer has been given.

Liaison with police and other officials

The Contractor shall keep in close contact with the police and other officials in the areas concerned regarding their requirements for the control of workmen, movement of traffic, or other matters and shall provide all assistance and facilities which may be required by such officials in the execution of their duties.

Preservation of trees

No tree shall be removed without prior written permission of the Engineer who will limit the removal of trees to the minimum necessary to accommodate the permanent works.

If trees are removed or damaged by the Contractor or his employees, without approval, then the Contractor shall replace such trees.

Replacement trees shall be not less than two years of age, obtained from a reputable nursery and of a species approved by the Engineer.

The Contractor shall plant, water and ensure that the replacement trees are properly established.

General protection

It shall be the Contractor's responsibility to ascertain the existence of all improvements and facilities which may be damaged by its operations, under or above ground, and he shall protect such facilities which are not to be removed. Such objects which are damaged by the Contractor's operations shall be replaced or restored to a condition as good as when the Contractor entered upon the work, at no cost to the Employer.

Damage to existing roads caused by the Contractor's equipment or operations shall be repaired by the Contractor at no cost to the Employer.

Protection from water

The Contractor shall keep the whole of the works free from water and shall be deemed to have included for all pumping, shoring, temporary drains, sumps and other measures and provisions necessary for such purposes and for clearing away and making good to the satisfaction of the Engineer any damage caused thereby.

Protection against fires

The Contractor is advised that, at all times, it is necessary to guard against fires starting within the Site or in the environs thereof, particularly as the result of the works or from the actions of his employees. The Contractor shall have available, at all times; a trained fire-fighting team provided with adequate fire-fighting equipment and shall deal with all fires on the Site howsoever caused.

Site security

The Contractor will be responsible for the security of works and of site installations during the Contract Period. He must provide fencing, watch and lighting as he deems necessary.

Description of material and workmanship

The following apply to all sections thereafter.

(a) Materials

Materials, commodities, components and equipment are to be new and unused unless otherwise specified. Handle, store, fix and protect all commodities with care to ensure that they are in perfect condition when incorporated into permanent work and handed over on completion

(b) Manufactures recommendations

Handle, store and fix every commodity strictly in accordance with the printed or written recommendations of the manufacturers and/or suppliers. Supply the engineer with copies of the manufacturer's recommendations. Inform the engineer if the manufacturer's recommendations conflict with any other specified requirements and obtain his instructions before proceeding.

(c) Standards

Where commodities or workmanship are specified by reference to Kenya Bureau of Standards (KS), or British Standards (BS), or Code of practice (CP), or international (ISO) or any other standard, such standards are deemed to be the latest published at the time of tendering. The Contractor will be deemed to have read and understood the standards specified, and no claim for lack of knowledge will be allowed. Substitution of commodities or standards of workmanship complying with other standards may be allowed at the discretion of the Engineer, but application for permission for such substitution must be made in writing in sufficient time to allow adequate irrigation. The Contractor must obtain Certificate of compliance with the standards and supply to the Engineer on request.

Water and power for use on the works

The Contractor shall be solely responsible for the location, procurement and maintenance of a water supply adequate in quality and quantity to meet his obligations under the Contract.

The Contractor shall be solely responsible for the location and continuity of the supply of water for use on the works. Supplies may be derived from boreholes, rivers and streams, but shall in all cases be to the Engineer's approval. The abstraction of water from any sources shall not interfere with any permanent water supply. The Contractor shall be solely responsible for the transporting of water from its source to the point at which it is required for construction purposes, and in such quantities and quality as to enable the works to proceed without hindrance due to the shortage of adequate water supplies.

The Contractor shall take care to avoid unnecessary use of water and to prevent any water running to waste.

The Contractor shall make his own arrangements for power supplies and shall be solely responsible for the location, procurement and maintenance of a power supply, adequate to meet his obligations under the Contract.

Fuel supplies

The Contractor shall arrange for obtaining, storing and distributing all fuel oils required for the completion of the works.

Telephone and communications

The Contractor shall obtain suitable means of communications during the course of the Contract. The use of radio communications may be permitted but the Contractor shall be responsible for obtaining all the necessary permits and licenses.

Sanitation

The Contractor shall provide adequate sanitation and refuse collection and disposal facilities complying with state laws and local by-laws for all houses offices workshops, and the like, erected on the site, all to the satisfaction of the Engineer.

The toilet facilities provided at the site by the Contractor shall be made available, free of charge, to the employees of the Contractor and any of his Sub Contractors.

The Contractor shall warn his employees and Sub Contractors that any employee found fouling the site shall be removed from the site immediately in accordance with the Conditions of Contract.

First aid and medical services

The Contractor shall provide and maintain all equipment necessary to render first aid in case of accidents, snakebites or other emergencies. This equipment shall be kept in readiness at the sites of the works, at camps and wherever the Contractor's staff may regularly live and work. The Contractor shall ensure that there are persons available at all such places with knowledge of simple first aid procedures and able to administer snakebite treatment.

Health checks

The Employer may arrange for the taking of swabs, urine and stool samples from all persons who will be working in and around the works, to ensure that all such persons are free from contagious diseases.

The Employer will pay all medical costs incurred in the taking and analyses of these samples. The Contractor shall make his employees available during normal working hours for undergoing the above mentioned health checks. Reasonable notice will be given.

The Contractor shall keep records in respect of all his employees, showing the dates on which health checks have been and will be carried out.

Every employee whom the Contractor intends to engage on the works shall, in addition to being available for the above tests, successfully undertake a test for typhoid and paratyphoid at an approved hospital or medical centre. The medical certificate for each employee shall be submitted to the Engineer before the employee shall be allowed on Site.

Inspections by the Engineer during the Defects Liability Period

The Engineer will give the Contractor due notice of his intention to carry out any inspection during the defects liability period. The Contractor shall, upon receipt of such notice, arrange for a responsible representative to be present at the times and dates named by the Engineer.

This representative shall render all necessary assistance and shall take note of all matters and things to which the Engineer shall direct his attention.

Health and safety

General

The Contractor shall use his best endeavor to ensure, so far as is reasonably practicable and to the satisfaction of the Engineer, the health, safety and welfare at work of his employees, including those of his Sub-Contractors, and of all other persons on the Site. His responsibilities shall include:

- i. Provision and maintenance of safe and properly illuminated Contractor's Equipment;
- ii. Establishment of safe and well-illuminated systems of working;
- iii. Provision of protective clothing and equipment;
- iv. Establishment of first aid stations, staffed and equipped to provide information, instruction, training and supervision on all aspects of safety and health on site;
- v. Appointing as Safety Officer one of his senior staff who shall have specific knowledge of safety regulations and have had experience of safety precautions on similar works and who shall advise the Contractor on all aspects of safety and health on Site;

Provision and maintenance of safe access to all work areas on the Site;

- vi. Provision of adequate sanitary facilities and maintenance of these in a clean and hygienic state for use by all persons employed by the Employer, Engineer, Contractor or other Contractors on the Site;

- vii. Measures to control flies, mosquitoes and pests in both working and recreational areas including chemical spraying, if necessary, in compliance with the rules and regulations of the Employer;
- viii. Reporting details of any accident to the Site Safety Officer as soon as possible after its occurrence;
- ix. Reasonable prevention of non-site personnel from entering the work areas.

Safety Equipment and Training

The Contractor shall provide:

- a) All necessary breathing apparatus, safety harnesses and any other equipment required to ensure safe working of all his personnel on Site;
- b) Test certificates for all safety equipment;
- c) Proof that all relevant personnel have received appropriate training.

Noise Control

The Contractor will be required to employ well maintained plant on site at all times and shall undertake all works strictly in accordance with the recommendations of BS 5228 standards (all parts) Noise Control on Construction and Open Sites or other equivalent agreed standards.

Health and Safety Plan

The Contractor is required to produce a health and safety plan covering the hazards that may apply during the Contract, the rules and standards to be used in assessing risk and in undertaking work and the methods that he will employ to ensure compliance with his plan.

The Health and Safety Plan shall include details of the following:

- Details of all potential risks and the proposals for dealing with such hazards;
- Controls to regulate risks that occur during all construction, testing and commissioning activities;
- Measures to avoid health risk in connection with the use, handling, storage and transportation of hazardous and harmful substances;

- Safety equipment and training proposals in respect of equipment referred to above.

Sign Boards

Before the erection of any signboards or posters by the Contractor, the Contractor shall obtain the approval of the Employer and the Engineer to the size, location and wording of such sign boards or posters.

Building Regulations

All buildings erected by the Contractor upon the Site and campsite or sites and the layout of the buildings shall comply with the Laws of Kenya and all local by-laws as far as they are applicable.

Progress Photographs

Photographs showing the progress of the works shall be taken by a competent photographer every month from positions to be selected by the Engineer.

Special photographs showing particular features of the works or matters of interest concerning the works or their surroundings shall also be taken from time to time as and when required by the Engineer.

Photographs shall not be less than 120 mm x 90 mm and shall be inscribed with the date when taken and a brief description or title.

All negatives shall be numbered; retained on the site and on completion of the works the negatives shall become the property of the Employer.

Contractor's Tracked Equipment

The Contractor's tracked equipment may not be run on any public or private road without the written permission of the owner or authority concerned.

Site Meetings

The Contractor shall be obliged to attend all site meetings at the appointed time.

Samples

The Contractor shall submit to the Engineer samples of materials to be used in the works, the samples must be fairly representative of the bulk to be supplied or used. Samples should be subject to relevant tests before submission and Test Certificate should accompany the samples

Testing of water retaining structures

All water retaining structures shall be tested for water tightness on completion in the following manner. The structure shall be filled with water in stages and held at each water level as the Engineer may require. Shall any dampness or leaking occur at any stage the water shall be drawn and the defects remedied to the satisfaction of the Engineer. The procedures shall be continued and finally the structure shall be allowed to remain full for seven days. Should any dampness or leakage or any other defects occur they shall be made good to the satisfaction of the Engineer and the structure retested until the water tightness is approved by the Engineer.

Cleansing and Sterilization of Water Retaining Structures

The inside of all potable water retaining structures and all interior pipe work and fittings shall be thoroughly cleaned and washed after the water tightness has been approved by the Engineer.

The structures shall be filled to overflow level with clean water containing 20 parts per million of chlorine and left shall be drained away and the structures for a period of at least 24hours. The chlorinated water refilled with clean water from which samples shall be taken for analysis to the instructions of the Engineer. If any of results of the analysis are unsatisfactory the sterilisation process shall be repeated until the results of the tests are satisfactory.

Substantial Completion

Substantial completion will mean the works are capable of being fully used by the employer in accordance with the intent of the design standards.

Test on Completion

On commissioning of the works the Contractor shall have on site personnel to ensure that all the plant is working satisfactorily. The personnel shall be on site for a minimum

of 7 days or for such time as required to determine that the equipment is operating to the satisfaction of the Engineer

Site Clearance upon Completion of Works

On completion of the works, the Contractor shall clear the site and remove all temporary buildings, equipment and debris. The Contractor shall level off and grade all areas used for haul roads and all building, store and workshop areas. The whole of the site shall be left in a clean and tidy condition.

EARTHWORKS

Conditions of Site

Before carrying out any work on the site the site shall be jointly inspected in conjunction with the Engineers representative to establish its general condition which shall be agreed and recorded in the writing.

Details to be recorded shall include location of all boundary and survey beacons, the condition of buildings surfaces, roads, tracks existing structures, services, fences and other information related to the site and elsewhere which may be affected by the Contractor operations.

In the case of way leaves for mains and pipelines the boundary of the way leaves shall be decided by the employer and the Contractor shall provide, erect and maintain in position from commencement to final completion of all works and all reinstatements in every section substantial timber stakes or similar approved timber markers not less than 1.5m high indicating position of every beacon at 100m or such other interval as the Engineer's representative may require.

In the event of any boundary or survey beacon being disturbed or displaced as a result of the Contractors operations the Contractor shall forthwith at his own expense replace the beacon and shall employ the services of an approved licensed Surveyor for this purpose.

Clearing site

The Contractor shall use methods approved by the Engineer to clear trees, bushes and vegetation from areas to be occupied by the permanent structures required for the Works.

The Contractor shall demolish, break up and remove buildings, walls, gates, fences, advertisements and other structures and obstructions, grub up and remove trees, hedges, bushes and shrubs and clear the site of the works at such time, and to the extent required by the Engineer. The materials so obtained shall so far as suitable be reserved and stacked for re use as directed; all rubbish and materials not for use shall be destroyed or removed from the site, as directed by the Engineer. Unless otherwise stated elsewhere, all other materials which are cleared shall become the property of the Contractor.

Where top soil has to be excavated this shall be removed and stacked on site. After completion of construction, it shall be spread over the disturbed ground, any surplus being disposed of as directed by the Engineer.

Underground structures and chambers where required to be demolished, shall be demolished to depths shown on the Drawings or as directed. They shall be properly cleaned out and back filled and compacted with suitable material to the direction and approval of the Engineer.

Vegetation

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

Bushes and Small Trees

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

Hedges

Where directed by the Engineer hedges shall be uprooted and disposed of by burning.

Felling Trees

Where directed by the Engineer, trees shall be uprooted or cut down as near to the ground level as possible and the rates entered in the Bills of Quantities shall include for cutting down, removing branches and foliage, cutting useful timber into suitable lengths, loading, transporting not more than 1 km and stacking or disposing of all as

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

Grubbing-Up Roots

Stumps and trees roots shall, unless otherwise directed, be grubbed up, blasted, burnt or removed and disposed of in approved dumps to be provided by the Contractor. Where directed by the Engineer, the holes resulting from grubbing up shall be filled with approved materials, which shall be deposited and compacted in layers not exceeding 225 Mm loose depth, to the same dry density as that of the adjoining soil. For the purpose of measurement, trees roots shall be classified according to the mean diameter of the stump measured across the cut.

Structures

Structures shall not be demolished unless specified or directed. Methods of demolition shall be approved.

Ground levels

Following the completion of site clearance and before the commencement of any earthworks, the site shall be surveyed in conjunction with the Engineers representative to establish existing ground levels and these agreed ground levels and these agreed ground levels shall form the basis for the calculation of quantities of any subsequent excavation and filling.

GENERAL EXCAVATION CLAUSES

Advance notification of proposed methods

The Contractor shall submit for the consent of the Engineer detailed proposals for methods, dewatering and safety arrangements in respect of each major or critical section of excavation, including drilling and blasting where appropriate. Except as may be otherwise agreed, the proposals shall be presented at least four weeks before the intended start date and the Engineer shall comment on the proposals within 2 weeks. Only after the receipt and revision of these proposals as may be requested, and with the written consent of the Engineer, shall the Contractor commence the excavation work to which the proposals refer.

The Engineer shall not unreasonably withhold consent and will request revisions of proposals only if he considers that an acceptable end result would otherwise be unlikely. The Contractor shall not subsequently vary the agreed procedure, except in detail, without having obtained the written consent of the Engineer to the change.

No consent as described above shall relieve the Contractor of his responsibility for carrying out his operations in a workmanlike manner and as safely as is reasonably possible to the lines and levels shown on the Drawings or as instructed by the Engineer.

Mechanical Excavation

A mechanical excavator shall be employed by the Contractor only if the sub soil is suitable and will allow the timbering of the trenches or other excavations to be kept sufficiently close to ensure that no slips falls or disturbances of the ground take place or there are no pipes, mains or other services or property which may be disturbed or damaged by its use.

When mechanical excavators are used a different depth of materials sufficient depth of materials shall be left over the bottom of excavations to ensure that the ground at formation level is not damaged or disturbed in any way. The excavation shall then be completed tom formation level by hand.

Excavation for pipe laying

The width of trench excavated for any size of pipe shall be e minimum required for efficient working after allowance has been made for timbering and for shuttering and shall be to the approval of the Engineer. Minimum sizes for different pipe diameters are as shown below;

Pipe diameter (mm)	100	250	300
Trench width (mm)	550	650	750

In the first instance the trench shall be excavated to within 1250mm of its formation and proper grade pegs shall then be set in the bottom of the trench by the Contractor for the accurate taking out of the rest of the excavation. Excavations shall then be completed by hand to provide a uniform and solid bearing for pipes throughout their entire length. The bottom of the trench shawl be smooth and shall be free from stones and other projections. Joint holes shall be as smalls a size as possible.

If instructed by the Engineer the Contractor shall be required to excavate the pipe trench to a depth of 100mm below the invert of the pipe and refill with compacted granular. Fill to provide a smooth and uniform bed for the pipes. Payment for such additional excavation and additional refilling will be made at the tendered rates.

The materials excavated from trenches shall be laid compactly at the sides of the trench except where in the opinion of the Engineers representative this would so obstruct any road or footpath as to prevent passage of traffic or pedestrians. In such cases the Contractor shall excavate material at such distances to the specifications of the Engineer.

Excavation for Foundations Thrust and Anchor Blocks

Excavation for foundation and for anchor and thrust blocks shall be to such depths as the Engineer may direct and no concrete or other material shall be placed until formation has been examined and approved.

The engineer may direct that a layer of excavation of not less than 75mm thick shall be left undisturbed and subsequently taken out by hand immediately before concrete or other material is placed. Similarly such concrete or other material placed in contact with the side face of an excavation the Engineer may direct that the final 75mm thickness of excavation be left undisturbed and subsequently take out neatly to profile by hand.

Areas of excavation which are to receive a layer of concrete as screening under the structural concrete shall be covered with the screening immediately the excavation has been completed.

DE-WATERING OF EXCAVATIONS

The Contractor shall maintain all excavations free from water, irrespective of its source, to the extent necessary for the execution of the Works or in the interests of safety, and to the satisfaction of the Engineer. He shall provide, install, operate and maintain all necessary appliances and Plant for this purpose.

The Contractor shall take all necessary precautions at points of discharge of water to avoid flooding or damage to the Works, adjoining works or property and to avoid pollution of watercourses.

Cuttings, embankments and borrow areas shall be drained so as to be free of standing water which would have adverse effects on the permanent works. All drains and ditches shall be properly maintained. The Contractor shall replace any material which, in the opinion of the Engineer, has been adversely affected by water.

The dewatering of excavations immediately prior to concreting shall not be commenced until at least one standby pump is on hand.

Remedial Work

Any damage resulting from the Contractor's operations during excavation, including damage to foundations and excavated surfaces shall be repaired at the expense of the Contractor and to the satisfaction of the Engineer.

Safety of Excavations and Persons

SAFETY OF EXCAVATIONS

The Contractor shall take full responsibility for the stability and safety of all excavation works and methods of construction including temporary support of excavated surfaces, diversion of water, pumping etc. He shall assume full responsibility for the safety and prevention of injury to personnel and for damage. His safety provisions shall comply with relevant local regulations and the requirements of Clause 1.35.

The Contractor shall provide and install handrails all necessary temporary supporting works such as timbering, shoring, anchorages and the like wherever such support is required. All support arrangements must be to the approval of the Engineer, who may order such support to be strengthened or altered if it is considered necessary in the interests of the work or to safeguard against accidents to workmen.

If the Contractor wishes to batter and/or cut back the face of an excavation in order to eliminate or reduce the quantity of timbering and shoring required, he shall obtain permission from the Engineer. Both the slope and the extent to which such battering is to be carried out must be agreed with the Engineer before excavation is commenced.

Timbering and shoring shall be so designed and constructed that, if necessary, it can be inserted as excavations proceed and safely withdrawn as backfilling is raised. Wallings and struts shall be suitably positioned to permit pipes and other materials to be installed in the excavations. No temporary supports shall remain in excavations after backfilling unless approved by the Engineer.

If slips of material occur in any part of the excavations during the execution of the Works or during the Defects Liability Period, the necessary remedial works shall be executed to the approval of the Engineer. Such remedial work shall be at the Contractor's expense in cases where the Engineer considers that the Contractor has not exercised reasonable preventive measures.

Classification of Excavated Material

Classification of excavation material shall be as in the Ministry of Public Works Standard Specification (MoWSS) section 5.

- (a) Class 1: "Rock" or Hard Materials shall include all material in which in the opinion of the Engineer requires blasting or the use of metal wedges or the use of compressed air drill for its removal or cannot be extracted by ripping with a tractor of less than 180 hp. And rear mounted heavy ripper. Individual boulders greater than 0.2m³ in volume shall be included in this class when their nature and size are such that they cannot be removed without recourse to one of these methods.

When a portion of excavation contains 75% or more by volume of boulders of this order such portion shall be considered as class 1 material throughout.

- (b) Class 2: "Normal" or Soft Materials shall include all material which in the opinion of the Engineer does not require blasting or metal wedges and sledge hammers, or compressed air drilling or rooting or ripping.

- (c) Class 3: "Compacted Gravel" or "Decomposed rock" shall include all material such as consolidated murrum and decomposed stratified rock, stones or boulders than 0.2m³ in volume which are harder than soft or normal material in that they may be extracted by ripping as defined in Class 1, or in confined spaces by hand excavation using compressor tools, provided all other reasonable steps to the satisfaction of the of the Engineer have been taken to facilitate the removal by the other methods.

- (d) "Waterlogged Material" Material of Class 2 and 3 that is excavated in a waterlogged condition and necessitates de-watering and pumping operations provided all reasonable precautions have been taken by the Contractor to dewater that material to the satisfaction of the Engineer.

In the event of a dispute as to the classification of a material, the decision of the Engineer shall be final. The Engineer shall be empowered to require rock to be excavated without explosives and payment will be made accordingly.

Limits of Excavation

The surfaces exposed by open cut excavation against which concrete is to be placed shall be excavated to the lines shown on Drawings or as required by the Engineer. No material shall remain within the outline of structural concrete. Elsewhere in open cut, the excavation shall be to the lines and levels shown on the Drawings or as required by

the Engineer except that local points of undisturbed hard rock may be permitted to extend within the required lines of excavation where approved by the Engineer.

REVISION OF LIMITS

During the progress of the work, the Engineer may find it necessary or desirable to revise the required lines and levels of any part of the excavations because of the conditions disclosed by the excavations or for any other reason. When the Contractor is advised of such revision before the excavation of such part has been commenced to the lines and levels shown on the Drawings, the revised excavation will be paid for at the billed rate for the main excavation. If, however, such revision requires additional excavation to be made after the excavation of such part has already been carried out to a point where the normal procedure for the main excavation cannot reasonably be used, the additional work shall be carried out as specified and will be paid for under the Contractual provisions for variations. This will include removal of rock and filling of resultant voids which, in the opinion of the Engineer, could not reasonably have been anticipated and are beyond the control of the Contractor.

EXCAVATION IN EXCESS

The Contractor shall not deliberately excavate beyond the lines and levels shown on the Drawings or designated by the Engineer (as above or otherwise) without prior written approval. Any deliberate excavation beyond the required lines and levels which is performed by the Contractor for any purpose (such as for working space) shall be at the expense of the Contractor. If such excavation should, in the opinion of the Engineer, require to be backfilled, such backfilling shall be done at the Contractor's expense to the satisfaction of the Engineer with grade 10 concrete or compacted granular or other approved fill material similar to the to the original formation level and/or dimensions as the Engineer require. Beneath load bearing structures, foundations and other reinforced concrete work, the filling to any over-excavation shall be of the same quality concrete as that required for the associated concrete structure unless the Engineer permits leaner concrete.

Where it is intended that concrete be cast against the side of excavated material the Contractor may alternatively propose to the Engineer to over-excavate, back shutter and backfill, but the Engineer will be under no obligation to accept the proposal and, subject to the conditions listed in the notes on measurement, no extra payment will be made if the alternative proposal is accepted.

Refilling of Excavations

All re-filing of excavations and trenches shall be thoroughly compacted in layers not exceeding 150mm. compacted thickness and by means which will not damage the works.

Hard Filling

Hard filling shall consist of approved clean mixed ballast, broken stone and or concrete. All the material shall be broken so as to pass through 75mm diameter ring. Fill shall be free from earth, clay, vegetation and other organic matter and shall contain no broken plaster mortar or other rubbish. It shall be laid in 300mm. layers each layer being properly spread and thoroughly compacted with rollers and/or rammers.

Refilling of Pipe Trenches

Filling around and for 300mm over the top of pipe shall be completed by hand using approved hand rammers and suitable material obtained from excavations. Materials for such refilling shall be free from stones greater 25mm.

Free Draining Fill

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

Graded Gravel for Drains

Graded gravel surround to drains shall be clean washed stone or crushed hard rock graded between 20mm and 5mm.

Hardcore

Hardcore for use in foundations and paved areas shall consist of sound hard stone or broken rock or concrete derived from excavations demolition of structures and shall be 75mm in size. Sufficient but not excessive blinding material of smaller sizes may be used at the discretion of the Engineer.

Pumice Filling of Roof

Insulation of for the horizontal reservoir roof shall be of broken pumice or such other stone as the Engineer may approve which has been washed, screened so as to eliminated dust and small particles. Pumice shall be distributed evenly and raked true to falls and to uniform finished thickness.

Sources of Fill Materials

The Contractor shall obtain the necessary general fill materials for construction of the works from excavations required to be undertaken for the permanent works.

Other fill materials such as sand, graded aggregate and rock fill for use as fill materials and all road works materials shall be obtained by the Contractor from sources to be approved by the Engineer.

The Contractor is required to provide details of his proposed source of fill materials within upon award of Contract. Irrespective of the details provided above, the Contractor will be entirely responsible for ensuring that the materials supplied meet the requirements of the Specification including for any necessary crushing, blending or other preparation.

Acceptance by the Engineer of the source of any material in no way will not be deemed to imply approval by the Engineer of the material to be supplied, nor shall approval of a potential borrow area be construed as constituting approval of all materials contained therein.

The Contractor will be responsible for obtaining all necessary approvals and temporary way leaves in connection with the obtaining of fill materials at his own cost.

The Contractor shall carry out at his own expense such sub-surface investigations, and obtain and submit such samples as are required by the Engineer, to enable the Engineer to assess the suitability of the materials in any proposed borrow area for use as fill. The Contractor shall keep accurate records approved by the Engineer of any test pits, trenches or drill holes which he makes for the purpose of investigating fill materials and a copy of such records shall be submitted to the Engineer immediately after completion of the test pit, trench, or drill hole. Samples recovered from such test pits, test trenches and drill holes and submitted to the Engineer for approval will be tested at the expense of the Contractor.

The Contractor shall give the Engineer not less than 14 days notice of his intention to develop any potential borrows area or quarry.

Excavated Material Suitable for Re-Use

Depending on its nature and quality, excavated material will either be:-

- Re-used as fill or backfill;
- taken to spoil.

The Contractor shall select materials as required and use his skills to avoid unnecessary waste of potentially usable materials.

Re-used material

Where the Contractor has been informed that the intention is that excavated material is to be re-used elsewhere in the Works, the Contractor shall ensure that his excavation techniques result in material suitable for the particular re-use requirement which is described.

In order to achieve particular materials the Contractor shall be prepared to sort materials into different stockpiles, which he must maintain in an uncontaminated condition. Any contaminated material shall be abandoned and replaced at the Contractor's expense. The Contractor may be required to cart the excess contaminated material to spoil or dispose them in-situ as directed by the Engineer. No extra costs will be paid to the Contractor for complying with such instructions. In executing the instructions issued by the Engineer, the Contractor will be required to give effect to the environmental concerns specified in Clause 1.19 hereof.

In all such cases it will be to the Contractor's advantage to phase as far as possible the excavation work to suit the construction in which the excavated material is to be re-used, particularly as no additional payment for double-handling of materials will be made.

Requirements specific to excavations for particular parts of the works Trenches, manholes and confined foundations

Confined and narrow excavations, such as for trenches and manholes, shall be excavated with particular care and attention to adequacy of temporary strutting because trench collapses are one of the commonest causes of death and injury on construction sites. The dangers inherent in inadequate supervision of such work,

particularly in water-bearing ground or damp conditions, cannot be over-emphasized. Continuous dewatering may be necessary in water-bearing ground.

Excavated material shall be cast or moved to a position sufficiently far away from the edge of the trench that instability of the trench wall (supported or otherwise) will not be called into question.

Excavated material which will clearly be unsuitable as backfill shall be removed to spoil as soon as possible after being excavated.

The widths of trenches for pipes shall be of the minimum required or as shown on the Drawings. Trenches shall not be so narrow that the pipe cannot be properly installed and jointed. Neither shall they be of excessive width or with battered sides because this will increase the loading on an unprotected pipe. At pipe joint locations the trench shall be widened and deepened to leave the joints unsupported so that they can be properly made and inspected. In Class 2 material an extra 150 mm over the depth for Class 1 material shall be excavated and replaced by pipe bedding material.

Supports shall be left in permanently when so directed when they are removed; the removal shall be done progressively as backfilling proceeds and in stages so that no voids are left.

Excavations at or near the toes of cuttings or embankment slopes shall be carried out in such a manner that there is no excavation into the slopes. In such trenches the pipe run shall be completed and backfilled at the end of each day's work unless otherwise agreed with the Engineer.

Structures

The Contractor shall excavate such that concrete and other structures may be formed to the lines and levels shown on the Drawings or as instructed by the Engineer. He shall increase the dimensions above the minima required in the interests of safety if so directed by the Engineer. In the course of the excavation work, the surrounding material shall be preserved in the soundest possible condition.

Excavation for foundations in Class 1 material shall be made to approximately 0.5 m above the levels shown on the Drawings. Final trimming shall be delayed until shortly before foundation preparation is due to commence.

During the course of blasting operations where, in the opinion of the Engineer, action is necessary to avoid damage to adjoining material or to adjacent structures, the Engineer may instruct the Contractor to reduce the explosive charges or to use other methods

such as pre-splitting or cushion blasting or to cease using explosives altogether and to continue by other means such as use of hydraulic breakers or line drilling.

Excavated surfaces which will remain permanently exposed shall be finished off in a neat and workmanlike manner and graded to provide adequate drainage. Rocky material liable to become detached from such surfaces shall either be removed (and holes backfilled where practicable) or anchored.

Excavated surfaces on or against which concrete structures will be cast shall be trimmed so that there are no projections within the permissible limits and cleaned to remove loose, soft or foreign materials by hand, air and water jets or other effective means. Unless shown otherwise on the Drawings or directed by the Engineer, the Contractor shall cast all in situ concrete structures against the excavated side surface in Class 2 material. Thus, when excavating in Class 2 material, excavation lines shall be kept as close as possible to the actual structural requirements.

Where the Contractor over-excavates sides of excavations by an additional width exceeding 500 mm, the Engineer shall be empowered to direct the Contractor to use formwork at his own expense to achieve the final surfaces of in situ concrete structures.

Disposal of excavated material

Material which has to be excavated in order to execute the Works, but is unsuitable for construction purposes or which is surplus to requirements as fill, shall be kept separate from other materials and not allowed to cause contamination of material required for use in the Works. Such unwanted material shall be disposed of by spreading the material in layers in designated spoil areas as directed by the Engineer. The material shall be compacted to the maximum practicable extent by routing the haulage traffic over the area. Permanent spoil areas visible after completion shall be shaped to follow existing contours such that the tips blend in with the local topography. Such disposal areas shall be kept neat and tidy. Surfaces shall be finished and graded to the extent necessary to provide surface drainage, and grassed to prevent future erosion of the materials.

Procedure on completion of excavation

Upon substantial completion of excavation, the excavated surface shall be cleared of spoil sufficiently to allow inspection by the Engineer. Final clearing and surface preparation procedures shall not commence until the Engineer has approved the excavated level. Neither shall any excavated surface for the Permanent Works be covered until the Contractor has obtained the approval of the Engineer. The Contractor

shall at his own expense uncover any excavation which has been covered without such approval.

Where the material replaced in an excavation is other than the material removed, supports shall be removed before or during filling and in such a way that the material from the walls of the excavation does not contaminate the replacement material.

Excavated surfaces which are to have fill material or concrete placed upon them shall be prepared as specified elsewhere.

Site investigation

The Contractor will be deemed to have made all necessary site investigations at the time of tender.

Drilling and blasting

The use of explosives by the Contractor shall at all times and in all respects be in accordance with BS 5607 and local regulations. Prior approval of the Engineer must be obtained and the method of blasting approved if the Contractor wishes to remove rock by blasting. The handling and use of explosives must comply with the explosives act or the department of mines and geology regulations. All necessary precautions to prevent injury or damage to person or property must be taken.

Before any blasting operation is commenced, the Contractor shall submit for approval such details as the Engineer may require, including drilling, charging and firing patterns and, when requested, calculations indicating the anticipated level of shock waves reaching nearby structures and works.

The Contractor shall use explosives for blasting in connection with the work only at such times and places and in such manner as the Engineer may approve, but such approval shall not relieve the Contractor from his responsibilities for injury, loss, inconvenience to persons, damage to the Works or to adjoining structures, roads etc., by the use of explosives. The Contractors blasting foremen shall have suitable experience to the approval of the Engineer and a current blasting license for the type of work required.

The Contractor shall be entirely liable for any accident which might occur and shall meet any necessary compensation for injury or damage caused to persons, animals, works or property. The Engineer shall have the power to limit or prohibit blasting in areas where, in his opinion, the use of explosives would have adverse effects or has been carried out in a reckless manner. In the event of such limitation or prohibition, the Contractor shall have no claim against the Employer for delay.

Where there is a possibility of shattering the rock to an unacceptable degree or damaging concrete already placed, the Engineer may order the Contractor to cease blasting and to excavate the rock by hydraulic breakers, line drilling or other approved methods.

Except as otherwise approved by the Engineer, no bench height in rock shall exceed 6 m. Blasting shall be carefully controlled as approved by the Engineer to preserve the rock beyond the required lines and levels in the soundest possible condition by such means as limiting the size of the charges, varying the size and spacing of the drill holes, and using delays. Any unstable or shattered material beyond such lines and levels shall be removed immediately to the satisfaction of the Engineer.

Where material of a particular grading is required to be produced from solid material for use in the Works, the Contractor shall adjust his procedures as may be necessary.

Stability of exposed rock faces

Earlier clauses, concerning excavation generally, have already made it clear that the Contractor's support measures shall be approved by the Engineer but that such approval will not relieve the Contractor of any of his Contractual responsibilities.

As rock excavation proceeds, the Contractor shall scale and remove from the surfaces of any excavation all loose, overhanging or otherwise dangerous rock. Permanent excavated slopes shall be carefully scaled to stabilize the surfaces to the satisfaction of the Engineer, and berms shall be maintained free of fallen rock.

If deemed necessary following excavation, natural and excavated surfaces of rock shall be supported by the most appropriate of rock bolts where required or approved by the Engineer. Temporary support measures shall be applied as soon as possible after excavation and in any case within 2 weeks of agreement that they are required.

Preparation of excavated surfaces

General procedures

As a general rule, foundation areas upon which fill is to be placed without any special measures are to be of material of equal competence to the initial layer of superimposed fill material.

After completion of excavation to the satisfaction of the Engineer, the exposed surfaces shall be cleared of all loose, softened or otherwise unsuitable material to the satisfaction of the Engineer.

Where filling or concrete is to follow, such preparation work will be carried out immediately before covering the excavation and the approval of the Engineer obtained before placement commences. The Contractor shall take all necessary measures to prevent any subsequent damage to or contamination of a cleaned and prepared surface, and shall maintain the surface in an acceptable condition until the commencement of the next stage of work.

Further procedures for class 1 materials

Where the surface exposed at foundation level is Class 1 material suitable to receive whatever is to be placed upon it, no further treatment will be required, other than compaction of exposed horizontal surfaces where considered necessary by the Engineer. The Contractor's excavated profile will be deemed to have taken account of any settlement resulting from compaction and no payments will be made for additional fill resulting from such compaction settlement.

Where, however, the replacement of unsuitable material below the nominal founding level is instructed, the foundation shall be brought back to the correct level as instructed by the Engineer. The replacement material will depend on the type of works concerned. The Contractor is advised that the Engineer will pay particular attention to the density and strength of exposed foundation materials and may order excavation of materials below the level indicated on the drawings together with its replacement in a re-compacted state. Any shortfall in material resulting from an increase in density of the sub foundation layer will be made up from material excavated from the foundation area above and compacted in the excavation to raise the sub foundation layer to the design profile. Payments for such work will be based on unit rates for excavation and filling as provided in the bill of quantities and shall be additional to the payments for preparation of surfaces which will be based on the final excavation profile instructed by the Engineer, including any over excavation as detailed above.

Particular items for preparation of surfaces to receive membrane linings (e.g. hold up pond linings) are included elsewhere in the specification.

Further procedures for class 2 materials

Where the surface is to be prepared to receive fill or concrete, surface cracks, crevices and fissures shall be cleaned by using hand tools, air hoses and water jets to remove loose material to a depth where sound material is encountered or until the depth cleaned out is at least four times the width of the surface opening, whichever is the lesser. After cleaning, the surfaces shall be prepared using appropriate methods as directed by the Engineer.

Particular requirements for concrete structures

Where the excavated surface is Class 1 material, the procedure shall be as already described.

Where the excavated surface is Class 2 material, the Contractor shall employ such measures as brushing, washing and air hosing to clean the surfaces to the satisfaction of the Engineer. Concrete of the grade directed by the Engineer (normally that of the adjoining part of the structure) shall be used for backfilling over break below foundation level at the Contractors expense unless another method is agreed to be acceptable.

Materials for filling

Sources

The Contractor shall submit to the Engineer for approval sufficient samples to determine whether each intended source meets the requirements for quality. No materials may be placed as fill without approval regarding the source. Notwithstanding any such approval, the Contractor shall be entirely responsible for ensuring that only material complying with the Specification is placed in the fill. The Engineer may at any time withdraw his approval of a source if he considers that the material from that source is no longer satisfactory for use in the Works.

The Engineer may refuse to approve a source of material proposed by the Contractor if he considers that other more suitable sources are available.

The Contractors attention is drawn also to Specification Clause 3.3.9 concerning the source of fill materials.

Material for general filling

Materials for general filling shall comprise suitable material excavated from the works which are, in the opinion of the Engineer, suitable for such use. The Contractor shall condition the material to obtain the moisture contents required for placing and compaction. The grading limits and other required properties not stated herein will be shown on the drawings.

Unless otherwise indicated, material will be classified "unsuitable" for general filling if it is:

- (a) clay or silt with an organic content exceeding 12% when tested under the relevant clauses of BS 1377
- (b) clay having a liquid limit exceeding 80 and/or plasticity index exceeding 55;
- (c) susceptible to spontaneous combustion;
- (d) Domestic or industrial refuse and any other material which, by virtue of its physical or chemical composition or moisture content, will not compact to form a long term stable fill.

Suitable material shall comprise all that which is acceptable in accordance with the requirements of the Specification, is within the specified limits of moisture content, is approved by the Engineer and will compact to form a long term stable slope as directed or shown on the Drawings. Where grading envelopes are given, the material shall lie within the grading zone required for the proposed location and shall moreover have a grading curve reasonably parallel to the given envelope i.e. it shall be neither gap-graded nor single-sized.

Graded aggregate filters

Graded aggregates for use as a filter layer in the construction of the holdup ponds and for use as fill in other areas shall comprise aggregates of a similar quality to that specified for concrete construction works as defined in Specification Section 6 and shall be graded according to the details indicated on the drawings.

Rock fill

Rock fill for use in layers in embankments or other areas as erosion protection (e.g. hold up ponds) shall comprise competent, approved rock graded in size within the grading envelopes indicated on the drawings. The individual pieces of rock fill shall be sound, hard, dense and durable to the approval of the Engineer.

General requirements for filling

During placement of fill in foundation areas where seepage is occurring, the Contractor shall direct such seepage away from placement operations. Fill should then be placed and compacted in such areas as quickly as possible.

The Contractor shall construct the fill areas only with materials meeting the specified requirements. The fill shall be free from sizeable lenses, pockets and layers of material

which are substantially different in grading from the surrounding material. Materials of widely different grading shall not be placed adjacent to each other.

Fill material shall be loaded, transported, placed and spread in the fill areas in such a manner that excessive segregation is avoided. Any material placed which does not meet the requirements shall be removed, remixed, blended or otherwise reworked at the expense of the Contractor to produce a material which does satisfy the specified requirements whether or not such material has been covered by other fill material.

The Contractor shall construct the fill areas by placing, spreading and compacting the fill material in continuous layers which extend over the entire surface area at that level and are approximately horizontal although they shall have sufficient falls to prevent ponding of rainwater.

The Contractor shall complete each layer of fill placed up to abutment contacts and ensure that compaction as specified is carried out adjacent to abutments. He shall not allow fill at abutment contacts either to lag behind or to get ahead and form feather edges.

All fill materials shall be leveled after spreading to obtain a surface free from irregularities, bumps and depressions. Except where space is limited, fill shall be placed by routing the hauling and spreading units over the fill area and, as far as is practicable, the hauling units shall be so routed that they do not follow the same paths but run evenly over the surface of the fill.

During the placing, spreading and leveling of materials, the Contractor shall remove all particles of rock or boulders which are large enough to interfere with the compaction of the layer of material.

The Contractor shall place, spread and level the fill material in such a manner as to achieve layers which are uniformly thick. Except as otherwise agreed, the thickness of material in each layer after compaction shall be 0.15 m.

Compaction definitions

Unless otherwise stated, earthworks compaction will be assessed with respect to the values of maximum dry density and optimum moisture content as determined by the 2.5 kg rammer method described in BS 1377.

Moisture conditioning

Moisture conditioning for compaction purposes may be required in the material to be used.

During filling operations, the Contractor shall maintain the moisture content of the fill within a range of 75% to 105% of the Standard Proctor Test optimum moisture content. Prior to dumping and spreading any layer, the surface of the previous layer shall be checked to ensure that the surface has not dried out or become desiccated. If the surface of the previous layer has dried out, the Contractor shall at his own expense lightly scarify and apply water to bring the moisture content within the range required.

Material which is too wet shall be removed from the fill or the moisture content reduced to the designated limits by any methods which will allow the water to evaporate from the fill material if the weather conditions are such that this can be achieved.

Where the fill material is too dry, water shall be added to the material by controlled sprinkling and disc-harrowing or other approved methods to blend the added water uniformly throughout the material as required. If this addition of moisture results in the fill material becoming too wet, it shall be dealt with as described above.

Equipment used to apply water to fill materials shall do so uniformly. Water bowsers shall be equipped with positive shutoff valves such that no leakage will result from the nozzles when the equipment is not operating. Any leaks that do occur shall be repaired immediately. The Contractor shall have in constant attendance during placing and spreading operations a suitable water bowser, a disc harrow or similar device and equipment suitable for lightly scarifying fill surfaces.

Compaction: end-product requirements

The Contractor shall blend, condition, transport, deposit and compact the fill material so that it has the correct moisture content and grading immediately before compaction and the correct relative density after compaction.

Material shall be placed in layers of compacted thickness to suit the compacting equipment but not exceeding 250 mm unless otherwise agreed with the Engineer. For smooth-wheeled rollers the thickness shall not exceed 150 mm.

Unless otherwise stated the layers of fill material shall be compacted to a relative dry density of not less than 95% relative compaction. Laboratory compaction tests shall be conducted by the Contractor at his own cost in conjunction with in situ density tests to be agreed by the Engineer.

If the Contractor's compacting equipment is not capable of producing the minimum required dry density, or if the number of passes required by the Contractor's equipment to produce the required density is in excess of 12 passes, the Engineer may require the Contractor to provide and use alternative equipment. Only when the

Engineer is satisfied that the equipment and number of passes are satisfactory will the Contractor be permitted to start placing and compacting the fill. The minimum number of passes to be expected is 10 if a tamping foot roller is used and 6 if a pneumatic tiered or vibratory roller is used.

Once the compaction equipment and the requisite number of passes have been approved by the Engineer these shall not be altered without agreement.

Compaction equipment shall be kept clean and maintained in good working order.

Each layer of fill shall be compacted by passing the compaction equipment over it the required number of times such that every part of the layer is covered by the compaction equipment to complete a pass. The routing of all plant shall be so arranged as to avoid concentration and over-compaction.

A pass shall mean one traverse of the wheel of a compactor across the surface of a layer in one direction only. To achieve one coverage when compacting by means of a towed pneumatic-tyred roller, 2 passes will normally be required with the roller so routed that on the second pass the tyres of the roller cover the areas between the tyre tracks of the first pass.

For compaction by vibratory rollers, an overlap of 150 mm shall be maintained between adjacent passes of the roller and this overlap shall be maintained where drums are towed in multiple arrangements behind a single tractor.

The Contractor shall take every precaution when operating compaction equipment in the neighbourhood of structures or the foundation of the embankment not to damage the structures or disturb the foundation. Any such damage or disturbance shall be repaired by the Contractor at his own expense.

1. Trial embankments

The Engineer may order that trial embankments be carried out to verify the maximum layer thickness and number of passes for the particular material and items of equipment intended to be used. Where such trial embankments are within areas of filling, no additional payment will be made.

Testing

General

The Contractor shall have available all necessary testing equipment to ensure that at all times he is fully aware of the moisture and density characteristics of fill materials. In

addition to the laboratory method of moisture determination, suitable field apparatus which will give a quick reading shall be employed by the Contractor. With this equipment a constant check shall be made by the Contractor on the moisture contents of all materials about to be placed or compacted. The results shall be correlated in the early stages of the Contract against laboratory test results using the fill material to be placed.

All testing equipment for fill materials shall be provided by the Contractor at his own cost.

Testing of fill materials shall be carried out by the Contractor at his own cost.

The methods of testing outlined in BS 1377 will be used unless other testing techniques are expressly required by the Engineer.

It will be necessary to adjust the frequency of testing as work proceeds in order to suit the variations in fill placing rates and areas covered. As a very general guide, the Contractor may expect as a minimum that, for each material placed as fill on an area on which work occupies a whole shift, a test of compacted fill for density, grading and moisture content will be required once per layer per shift. The Engineer shall be empowered to increase the frequency if he considers this necessary in the interests of the quality of the work or if the area concerned is of above-average importance or sensitivity.

Further control tests in borrow areas and stockpiles shall be carried out as necessary to check that the material being placed, or about to be placed, meets the requirements of the Specification, to optimize placing destinations and to identify unsuitable material.

Whenever the Contractor conducts tests on materials used or to be used as fill, he shall immediately make the results of his tests available to the Engineer, who will have access to and may take over or supervise any portion of such sampling and testing, in addition to any sampling and testing he may conduct independently.

When requested by the Engineer, test pits for quality control shall be excavated to depths not exceeding 1 m and shall be backfilled by the Contractor with fill material similar to that excavated. The Contractor shall render such assistance as is necessary to enable pitting, sampling and testing to be carried out expeditiously. The Contractor is advised that no separate payments will be made for such test pits as the Engineer may request nor for the backfilling thereof and is advised to allow for a minimum of 50 such pits to be provided in fill areas during the Contract. However, if the tests fail, the Contractor will provide further test pits required by the Engineer to enable him draw the required conclusion. The extra pits shall be issued at the Contractor's expense

Construction joints in fill

Construction joints shall not be used in fill areas where there is a practicable alternative.

The sloping face of construction joints, whether required or approved by the Engineer, shall not be steeper than 1 in 1.75 and, during placement, the material shall be compacted as close as practicable to the exposed face of the construction joint.

Prior to placing a layer of fill materials against previously placed fill in any construction joint, the surface of the material previously placed in the area of the joint shall be cut back a horizontal distance of not less than 1.5 m beyond that required to expose a dense face satisfactory to the Engineer.

The Contractor shall do everything necessary as required by the Engineer to match and bond the materials placed against a construction joint into the previously placed material in order to achieve a dense homogeneous fill across the construction joint.

Suspension and resumption of operations

The Contractor shall suspend fill placing operations whenever inclement weather conditions are such that the material cannot be placed and compacted at the optimum moisture content and to densities equal to those which would be achieved under normal conditions. If fill placement is suspended because of precipitation or impending precipitation or for any other reason, the surface of impervious fill materials shall be graded and rolled smooth to seal the surface and to avoid unnecessary absorption of moisture. Payment will not be made for standing time consequent upon inclement weather.

Where operations have been suspended, the effects of rain or other adverse conditions shall be assessed before placing is resumed. Prior to resumption of fill placement, any material not conforming to the specified requirements shall be removed or reconditioned until it is suitable. Equipment shall not otherwise be allowed to travel or work on the fill, except for necessary removal, until it has dried sufficiently to prevent excessive rutting and to allow the equipment to operate satisfactorily.

Dressing of outer faces

The Contractor shall dress the outer faces of fill areas and other filled areas to form a neat, uniform, workmanlike appearance and shall use for this purpose a hydraulically operated backhoe or other approved equipment. To achieve a uniform compacted density to the extreme edges of the fill area, the Contractor shall at his own expense

overfill the fill areas, compact to the edge and subsequently trim the faces to the required lines indicated on the drawings. The Contractor is advised that this particular requirement will be applied to all exposed faces of filled areas. The dressing of the faces shall be completed as the work proceeds and the Contractor shall ensure that any areas requiring dressing are at all times within the operating range of the equipment.

Special compaction

In areas which are inaccessible to the normal compaction equipment or which require special compaction for other reasons e.g. around structures or instrumentation, the Contractor shall use special hand or other suitable compactors, approved by the Engineer, to achieve the desired compaction. In general such compaction shall be used near concrete structures, against irregular rock surfaces or in zones of very limited area. The fill shall be forced into all irregular depressions and corners.

Where special compaction is required, the fill material shall be placed in layer thickness approved by the Engineer but not exceeding 150 mm. Compaction by special methods shall be carried out, as agreed by the Engineer, to achieve dry densities equivalent to those being achieved in adjacent areas by normal compaction methods.

Equipment used for special compaction shall be hand-guided heavy duty mechanical tampers, hand-guided vibratory rollers, hand methods or other such compaction arrangements suited to working in confined spaces as may be approved by the Engineer.

Tolerances

The Contractor shall construct embankments, fill areas and any required zones therein such that maximum local deviations from the finished outside slope surface of the embankment do not exceed 0.2 m measured at right angles to the surface. In addition:

- a. The finished outside slope surface shall not be uniformly lower than the required lines;
- b. The top surface shall not be less than the required dimensions;
- c. Where an embankment has berms, the levels of the berms shall not be lower than the required elevations;
- d. All finished slopes shall drain effectively in accordance with the arrangements shown on the Drawings;

- e. The Contractor must allow for any settlement that may take place during the course of construction. If the Engineer envisages that there will be some post-construction settlement, the levels of the Drawings will indicate and allow for such settlement and the Contractor shall build to those levels and will be paid for so doing. The level of the finished surface shall nowhere be lower than that prescribed.

Protection and maintenance

The Contractor shall maintain all fill in a satisfactory condition until the completion of the work.

He shall shape the surface and take such steps as are necessary to avoid ponding of water on the fill or contamination of the fill by traffic or other causes, and shall at all times keep the surface and slopes of the fill areas free from rubbish, rejected or unsuitable material, and waste materials.

Backfilling of excavations

Backfilling of areas excavated to remove unsuitable material below formation level shall normally be with Class 1 material acceptable to the Engineer. In marshy areas the Contractor may be instructed to use, rock fill in compacted layers or other special methods to produce a surface which will remain stable when fill is placed on it and compacted.

Fill material used for backfilling excavations shall be approved Class 1 material free from large clods, large rocks, rubbish and other undesirable constituents. Where free-draining material is shown on the Drawings, all layers thereof shall be of consistent quality.

Backfill material shall normally be selected by the Contractor from excavated material at the Site which he has set aside for this purpose. When suitable backfill material cannot be obtained in this manner, it shall be obtained by the Contractor from another borrow source and brought to the Site. Both the source and the type of material to be used will be subject to approval by the Engineer.

Procedure

Unless otherwise agreed, backfilling shall be carried out in layers not exceeding 150 mm after compaction. Each layer shall be watered to the approximate optimum moisture content and thoroughly compacted uniformly over the full area of each layer to the density of the surrounding ground. Unless otherwise instructed, vibrating plate or similar compaction equipment shall be used in confined areas. Where appropriate the final layer of backfill shall be neatly finished to accord with the surrounding ground

levels and any settlement which occurs shall be made good by re-compacting and the addition of further compacted backfill.

MATERIALS

Pipes and fittings

- i. The approval in writing or otherwise by the Engineer of any materials shall not in any way whatsoever relieve the Contractor from any liability or obligation under the Contract and no claim by the Contractor on account of the failure, insufficient or unsuitability of any such materials will be entertained.
- ii. All items shall be suitable for water works purposes and for use with cold water installation and operation being in a tropical climate.
- iii. All items hereinafter specified shall be to such other Standard or Specification which in the opinion of the Engineer provides for a quality of material and workmanship not inferior to the Standard Reference Number (SRN) quoted. The Standard or Specification must be submitted to the Engineer for approval before commencement of work.
- iv. All ferrous pipes and fittings shall be coated with bituminous protective paint suitable for use in and transport through a tropical climate.
- v. The Contractor shall supply to the Employer a certificate stating that each item supplied has been subjected to the tests hereinafter laid down and conforms in all respects to the said Specifications.
- vi. The Contractor shall provide adequate protection to all piping, flanged items and valves so as to guard effectively against damage in transit and storage and ingress for foreign matter inside the valves.
- vii. All pipe work and fittings shall be subjected to a work hydrated test pressure, which shall be not less than twice the maximum operating pressure.
- viii. The Contractor should exercise diligence to provide the best material
- ix. Where applicable the manufacture's Specification should accompany all offers. The name of the manufacturer must in every case be stated.
- x. Where necessary the Contractor shall provide rubber gaskets all other bolts, nuts etc. to undertake jointing at fittings etc.

- xi. Any article required under this Contract. Which are found to be faulty due to a crack, flaw or any other reason or is not in accordance with the specification stipulated will not be accepted nor will the Employer be liable for any charges in respect of such an article. Where any such rejected article can, in the opinion of the Engineer, be rendered usable, the Contractor may deal with it accordingly and include it in the Contract at a price to be mutually agreed. Straight pipes which have been cut will be accepted provided the length is not less than 4 meters or two thirds of the standard length whichever is the lesser and will be priced pro-rata.
- xii. Wherever possible, sample of pipes and fittings shall be submitted for approval of the Engineer prior to the Contractor obtaining the total requirements.

Un-plasticized uPVC pipes

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

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

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

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

The pipes of 50mm diameter and over shall consist of a grooved socket at one end of the pipe.

The socket shall be designed to give a clearance fit on the outside diameter of the parent pipe.

The sealing medium, which shall seat in the groove, shall be a rubber ring.

If the formation of the socket and groove results in the thinning of the original wall thickness of the pipe, it shall be compensated for by shrinking on the socket area a reinforcing sleeve of the same material as the pipe.

The socket and groove shall incorporate no sharp angles where the stress points are created.

The joints shall take 10% deformation of the spigot at the point where it enters the socket without leakage from the pipe when subjected to the test pressure specified for

the pipe. Thermal expansion of the pipe shall be capable of linear deflection up to 3 degrees.

The sealing ring shall be of first grade natural rubber and the physical properties of the mix.

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

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

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

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

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

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

Pipes and fittings shall be marked at no greater than one meter intervals showing their class and diameter.

Pre- cast concrete units

Pre-cast concrete covers to be pre-cast units for use in the works, whether instructed under the Contract or proposed by the Contractor.

Formwork for pre-cast units

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

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

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

Release agents used for remolding shall not stain the concrete or affect its properties.

Reinforcement for pre-cast units

Reinforcement in pre-cast units shall comply with general requirements and those of Clause 6.1. When preformed cages are used the cages shall be made up on jigs to ensure dimensional accuracy and shall be carefully supported within the mould in such a way that they cannot move when concrete is placed. Reinforcement may be tack welded where bars cross to provide rigidity in the cage but reinforcement shall not be welded.

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

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

Casting of Units

Concrete for pre-cast units shall comply with Clause 5.9 using the class of concrete specified on the drawings.

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

Curing Pre-cast Units

Requirements for curing shall be generally as set out in Clause 5.11

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

If the Contractor proposes curing at elevated temperatures, the method shall be subject to the agreement of the Engineer and shall include means whereby units are heated and subsequently cooled evenly without sudden changes of temperature.

Dimension tolerances of pre- cast units

Units shall be accurately formed to the dimensions shown on the drawings unless closer tolerances are called for by the Engineer.

Surface finish of pre- cast units

The formed faces of Pre- cast units shall be finished on class of finish is specified on the drawings.

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

In cases where a special finish is required a trial panel shall be constructed by the Contractor which after approval by the Engineer shall be kept available for inspection at the place of casting and production units shall thereafter match the approved pattern.

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

Handling and storage pre- cast units

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

Pre-stressed units and large Pre- cast normally reinforced units shall be handled and stored so that no stresses shall be induced in excess of those which they will incur in their final positions in the works unless they have been designed to resist such stresses.

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

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

Testing pre- cast units

Pre- cast units shall be capable of safely sustaining the loads which they have been designed to carry. The Contractor shall subject units selected by the Engineer to load tests simulating the working conditions. Detailed of such tests shall be agreed between the Engineer and the Contractor.

In case of units subjected to bending loads the test piece shall be supported at full span and a loading equivalent to 1.25 times the sum of the live and dead loads which were assumed in the design shall be maintained for one hour without the appearance of any signs of distress. The recovery one hour after the removal of load shall be not less than 75 per cent of the full load deflection.

If the unit fails to meet the above requirement, further tests shall be carried out on two more units. If either of these fails the whole batch of the unit will be rejected.

If the Engineer so requires, a test of destruction shall also be carried out which on units subject to bending shall be as follows:

The unit shall be supported at full span and a load applied in increments instructed by the Engineer up to 95 per cent of the designed ultimate load. This load shall be held for 15 minutes without failure of the unit. The deflection at the end of this period shall be not more than 1/40th of the span. The load shall then be further increased until failure occurs.

If the unit fails to sustain the required load for the prescribed period or if the deflection exceed the specified amount the Engineer may order two further tests, and if either of these fail, the batch of units which they represent may be rejected.

Submission of samples

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

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

Samples of materials approved will be retained at the Engineer's office until the completion of the Contract. Samples may be tested to destruction.

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

Materials for concrete

General

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

Cement

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

Bulk cement shall be transported in vehicles or in containers built and equipped for the purpose.

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

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

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

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

Bulk cement shall be stored in weatherproof silos, which shall bear a clear indication of the type of cement contained in them. Different types of cement shall not be mixed in the same silo.

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

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

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

All cement used in the Works shall be tested by the manufacturer or the Contractor in a laboratory acceptable to the Engineer. The Contractor shall supply two copies of each certificate to the Engineer.

Each set of tests carried out by the manufacturer of Contractor shall relate to not more than one day's output of each cement plant, and shall be made on samples taken from cement which is subsequently delivered to the site. Alternatively, subject to the agreement of the Engineer's the frequency of testing shall be one set of tests for every 200 tons of cement delivered to site from each cement plant.

Cement which is stored on site for longer than one month shall be retested at an approved laboratory for every 200 tones, and at monthly intervals thereafter.

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

The Contractor shall keep full records of all data relevant to the manufacturer, delivery; testing and use of all cement used in the works and shall provide the Engineer with two copies thereof.

Fine aggregate

Fine aggregate shall be clean hard and durable and shall be natural sand, crushed gravel sand or crushed rock sand. All the material shall pass through a 5mm standard sieve. In order to achieve an acceptable grading, it may be necessary to blend materials from more than one source.

The fine aggregate shall not contain iron pyrites or iron oxide, It shall not contain mica, shale, coal or other laminar, soft or porous materials or organic matter unless the Contractor can show by comparative tests, on finished concrete, that the presence of such materials does not adversely affect the properties of the concrete.

Other properties shall be as out below:-

Content passing a 75 micron standard sieve shall not exceed 3 per cent for natural of crushed gravel sand of 15 per cent for crushed rock sand.

Chlorides soluble in a 10 per cent solution by weight of nitric acid shall not exceed 0.05 per cent by weight expressed as chloride ion when tested, subject also to the further restriction given in the note on total chloride content in sub-clause 4.5 (d)

Sulphates soluble in a 10 per cent solution by weight of hydrochloric acid shall not exceed 0.4 per cent by weight expressed as SO when tested, subject also to the further restriction given in the note on total sulphates content in sub-clause 4.5(d)

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

Organic impurities:

If the test for presence of organic impurities in aggregates described below shows that more than a trace of organic impurities is present, the fine aggregate shall not be used in the works unless the Contractor can show by tests on finished concrete that the presence of organic impurities does not adversely affect the properties of the concrete.

Test for presence of organic impurities aggregates:

This test is designed to indicate the presence of organic impurities in aggregates used for making concrete.

A 350 cc graduated bottle shall be filled to the 120 cc mark with a sample of the aggregate liquid after shaking gives a total volume of 200 cc. The bottle shall be stopped, shaken thoroughly and allowed to stand for 24 hours. If, after 24 hour, the colour of the solution is no darker than a pale brown, the aggregate under test may be deemed satisfactory.

Coarse aggregate

Coarse aggregate shall be clean and durable crushed rock, crushed gravel or natural gravel. The material shall not contain any iron pyrites, iron oxides, flaky or laminated material, hollow shells coal or other soft or porous material, or organic matter unless the Contractor can show the comparative tests on finished that the presence of such materials does not adversely affect the properties of the concrete. The pieces shall be angular rounded or irregular.

Coarse aggregate shall be supplied in the nominal sizes called for in the Contract and shall be graded for each nominal size.

Other properties shall be as set out below:-

The proportions of clay silt and other impurities passing a 75 micron standard sieve shall be no more than one per cent by weight.

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

40mm nominal size and above 2% of dry weight

20mm nominal size 5% of dry weight

10mm nominal size 15% of dry weight.

Chlorides soluble in a 10 per cent solution by weight of nitric acid shall not exceed 0.03 per cent by weight, expressed as chloride ion when tested but subject also to the further restriction under the percent solution by weight of hydrochloric acid shall not exceed 0.4 per cent by weight expressed as 50g when tested subject also to the further restriction given in the total sulphates content hereunder.

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

When tested in accordance with Test C289 of the American Society for Testing of Materials or approved equivalent, the aggregate shall be non-reactive.

Flakiness Index when tested shall be as set out hereunder:

For 40mm stone and above, not more than 40

For 20mm stone and below, not more than 35

If the Flakiness Index of the coarse aggregate varies by more than five units from the average value of the aggregate used in the approved trial mix, then a new set of trial mixes shall be carried out if the workability of the mixes has been adversely affected by such variations.

Impact value: Not more than 45 per cent when tested.

Ten per cent fines value: Not less than 50kN when tested.

Shrinkage: When mixed with other ingredients in the approved proportions for concrete and tested, the shrinkage factor shall not exceed 0.05 per cent.

Organic impurities: If the test for presence of organic impurities in aggregate shows that more than a trace of organic impurities is present, the aggregate shall not be used in the works unless the Contractor can show by tests on finished concrete that the presence of organic impurities does not adversely affect the properties of the concrete.

Water absorption: The aggregate shall not have water absorption of more than 2.5 per cent when tested.

Aggregate Crushing value (ACV): not more than 35 per cent

Los Angeles Abrasion (LAA): not more than 50 per cent.

NOTE: Total chloride and sulphates content:

Total chloride content, expressed as chloride ion, arising from all ingredients in a mix including cement, water and admixtures shall not exceed the following limits, expressed as percentage of the weight of cement in the mix:-

For pre stressed, concrete, steam cured concrete or concrete containing sulphates cement: 0.05 per cent.

The total sulphates content expressed as 50g of all the ingredients in a mix including cement, water and admixtures shall not exceed 0.4 per cent by weight of the aggregate or 4.0 per cent by weight of the aggregate or 4.0 per cent of the weight of cement in the mix whichever is the lesser.

Testing aggregates

Acceptance testing

The Contractor shall deliver to the Engineer samples containing not less than 50kg of any aggregate which he proposes to use in the Works and shall supply such further samples as the Engineer may require. Each sample shall be clearly labelled to show its origin and shall be accompanied by all information.

Tests to determine compliances of the aggregates with the requirements of Sub-Clause 7.5 (c) and (d) shall be carried out by the Contractor in laboratory acceptable to the Engineer. If the tested materials fail to comply with the specification, further tests shall be made in the presence of the Contractor and the Engineer and acceptance of the material shall be based on such tests.

A material shall be accepted if not less than three consecutive sets of test results show compliance with the Specification.

Compliance testing

The Contractor shall carry out routine testing of aggregate for compliance with the Specification during the period that concrete is being produced for the Works.

The tests set out below shall be performed on aggregate from each separate source on the basis of one set of tests for each day on which aggregates are delivered to site provided that no set of tests shall represent more than 250 tonnes of fine aggregate not more than 500 tonnes of coarse aggregate, and provided also that the aggregate are of uniform quality, if the aggregate are of uniform quality, if the aggregate from any source is variable, the frequency of testing shall be increased as instructed by the Engineer.

In addition to the above routine tests, the Contractor shall carry out the water content of the concrete as required by the specification.

Moisture content: as frequently as may be required in order to control the water content of the content of the concrete as required by the Specification.

Chloride content: As frequently as may be required to ensure that the proportion of Chlorides in the aggregate do not exceed the limit stated in the Specification.

The Contractor shall take account of the fact that when the chloride content is variable it may be necessary to test every load in order to prevent excessive amounts of chloride contaminating the concrete. For this purpose the Contractor shall use the rapid field test (the Quanta test). In the event of disagreement regarding the results of the field test, the chloride content of the aggregate shall be determined in the laboratory (the volhard test).

Delivery and storage of aggregates

Aggregate shall be delivered to site in clean and suitable vehicles. Different types of sizes of aggregate shall not be delivered in one vehicle.

Each type or size of aggregate shall be stored in a separate bin or compartment having a base such that contamination of the aggregate is prevented. Dividing walls between bins shall be substantial and continuous so that no mixing of types or sizes occurs.

The storage of aggregates shall be arranged so that, as far as possible rapid drying out in hot weather is prevented in order to avoid sudden fluctuation in water content. Storage of fine aggregates shall be arranged so that they can drain sufficiently before use in order to prevent fluctuations in water content of the concrete.

Water for concrete and mortar

Seawater or brackish water containing more than 1000 ppm chloride ion or 2000 ppm sulphate ion shall not be used for mixing or curing concrete.

Water shall be clean and free from harmful matter.

The Contractor shall carry out tests to establish compliances with the specification.

Building stone

All building stones shall be capable of withstanding when wet a crushing stress of 1.4kg /sq.mm. The source of stone shall be approved by the Engineer and stone supplied there from shall be free from Magadi, overburden, mudstone, cracks, sand holes, veins, laminations or other imperfections.

The stone shall be chisel dressed into true rectangular blocks, with each surface even and at right angles to all adjoining surface, to the size specified. For exposed stonework the maximum permissible variation of any of the specified dimensions shall be 6mm provided that cut stone, supplied as rock face stone may be hammer dressed on one

face only or on one face and one end if in other respects it conforms to this specification. Stones shorter than 375mm will not be accepted.

Unless the Engineer allows otherwise, the Contractor shall at his own expense provide and dress four 100mm cubes of stone for testing.

The stone shall be sound when tested except that:-The treatment shall be repeated for 10 cycles only and

The second criterion of failure shall be amended to allow for a loss of weight of not more than 20kg of its original weight.

Stone Dust

Stone dust for building shall be blacktrap screened to the following grading:-

Passing 10mm sieve	100%
Passing No. 4 sieve	85% - 100%
Passing No. 100 sieve	5% - 25%

Murram

Murram shall be from an approved source quarried so as to exclude vegetable matter, loam, topsoil or clay. The California Bearing Ratio of the murram, as determined for a sample compacted to maximum density and allowed to soak in water for four days, shall not be less than 30%. This C.B.R. is a guide to quality only and the compaction in the work will be judged by density.

Water for cement treated materials

If water for the works is not available from the Employer's supply, the Engineer's approval must be obtained regarding the source of supply and manner of its use. Water to be used with cement or lime shall be free from salt, oil, alkali, organic matter and other deleterious substances: Tests for water for making concrete, all to the cost of the Contractor.

Cement mortar

Cement mortar shall consist of proportions by volume as specified or Portland cement, natural sand or crushed natural stone or a combination of both Building Sands from Natural Sources. The constituent materials shall be accurately gauged and mixed in an approved manner. Cement mortar shall be made in small quantities only as and when required, and any mortar which has begun to set or which has been mixed for a period of more than one hour shall be rejected.

Hydrated Lime

Building Limes and shall be of the semi – hydrated type.

Calcium chloride

Calcium chloride shall be good industrial grade, and shall be obtained from an approved source.

Lime mortar

Lime mortar shall consist of proportions by volume as specified by hydrated lime and natural sand or crushed natural stone or a combination of both. The constituent materials shall be accurately gauged and mixed in an approved manner in a proportion specified.

Cement – lime mortar

Cement – lime mortar shall consist of Portland Cement, hydrated lime and natural sand or crushed natural stone or a combination of both. The constituent materials shall be accurately gauged and mixed by volume in an approved manner in proportion specified.

Cement – lime mortar shall be made to set or which has been mixed for a period of more than two hours shall be rejected.

Cement grout

Cement grout shall consist of Portland Cement and water mixed in the proportion of one part by volume of cement and one and a half parts by volume of water. The grout shall be used within one hour of mixing.

Cast stone

Cast stone shall be manufactured by an approved manufacturer to the shapes and dimensions shown on the drawings. Cast Stone. It shall have dense and even surface of the texture and colour detailed on the drawings or required by the Engineer. Where indicated, exposed faces of the stone shall be formed of a specially graded mix. Metal bond ties of approved manufacturer shall be cast in with the stone as shown on the drawings. Samples of the completed stone shall be submitted for the Engineer's prior approval.

All stones shall be protected from damage during transport and erection by means of cement slurry coating or by other approved methods.

Reinforcement for concrete

Reinforcement which shall comply with the following Standard, covers plain and deformed bar reinforcement and steel fabric to be cast into concrete in any part of the works but does not include pre-stressing tendons or any other embedded steel.

All reinforcement shall be from an approved manufacturer and, if required by the Engineer, the Contractor shall submit a test certificate from the manufacturer.

All reinforcement for use in the works shall be tested for compliance with the appropriate Standard in a laboratory acceptable to the Engineer and two copies of each test certificate shall be supplied to the Engineer. The frequency of testing shall be as set out in the relevant Standard.

In addition to the resting requirement described above, the Specification shall be removed from site.

All reinforcement shall be delivered to site either in straight lengths or cut and bent. No reinforcement shall be acceptable in long lengths which have been transported bent over double.

Any reinforcement which is likely to remain in storage for a long period shall be protected from the weather so as to avoid corrosion and pitting. All reinforcement which has become corroded or pitted to an extent which in the opinion of the Engineer will affect its properties shall either be removed from site or may be tested for compliance with the appropriate Standard at the Contractor's expense.

Dowel bars

Dowel bars and tie bars shall consist of mild steel, or deformed bars of high yield steel and they shall be free from oil, paint other than bond – breaking compound, dirt, loose rust and scale.

Dowel bars and tie bars shall be of sizes as shown on the drawings and directed by the Engineer, and shall be straight, free from burred edges, or other irregularities and shall have their sliding ends sawn or , if approved, sheared.

Bond breaking compound for dowel bars shall consist of 66 per cent of 200 pen bitumen blended hot with 14 per cent light creosote oil and, when cold, brought to the consistency of paint by the addition of 20 per cent solvent naphtha or other approved compound meeting the following requirements.

- i. It shall not retard or in any other way affect the setting of concrete.
- ii. The average bond stress on bars coated with the compound with half their length cast into concrete specimens and subject to pull out tests at 7 days shall not exceed 0.14 Newtons per square millimeter and the total movement other dowel bar relative to the concrete shall not be less than millimeters in section and 0.45 metre long and made with the same mix proportions as used in the Works.

Structural steel for welded work

The use of Structural Steel in Building and for welded work, High Yield Stress and High Tensile Structural Steel, High Tensile (Fusion Welding Quantity) Structural Steel for Bridges, etc, and General Building Construction.

Waterproof underlay

Waterproof underlay shall consist of wither waterproof paper. Waterproof Building Paper, containing approved fibrous reinforcement, or 900 Gauge polythene sheeting as stated in the Bill of Quantities.

Preformed joint filler

Preformed joint filler shall be of the thickness shown on the drawing or as stated in the Bills of Quantities.

The material comprising joint filler shall be as stated on the drawings or approved by the Engineer.

UPVC pipes and fittings

Un-plasticized polyvinyl chloride pressure pipe shall have outside diameters complying with ISO 161-1 1978.

Concrete pipes

Reinforced concrete pipes and special fittings for drainage purposes shall have "Cornelius" or similar approved spigot and socket flexible joints and shall comply with BS 5911 "Concrete cylindrical pipes and fittings including manhole inspection chambers and street gullies".

Unreinforced concrete pipes with ogee joints shall comply with BS 5911 Part 3.

Concrete porous pipes

Concrete porous pipes shall comply with the requirements of Porous pipes for under-drainage.

Concrete drain invert blocks

Pre- cast concrete invert blocks shall be manufactured from concrete Class 20/10 as specified on drawing using maximum 12mm size aggregate. If required, cube test certificates shall be supplied by the manufacturer.

Concrete slabs for open drains

Pre- cast concrete slab for lining open drains shall be manufactured from concrete Class 20/10 as specified in Table 4.2 using maximum 12mm size aggregate. If required cube test certificates shall be supplied by the manufacturer.

Manhole covers and frames

Cast Manhole Covers, Road Gully Gratings and Frames for Drainage Purposes except that the manhole covers shall be constructed of mild steel, concrete filled, in accordance with the standard detail drawings.

Foul water sewer manhole shall have triangular Grade "A" heavy duty covers and frames.

Circular manhole covers and frames shall be used on surface water sewer manhole.

Gully grating and frames

Gully grating and frames shall be of nominal size 500mm x 350mm except that the gully grating shall be constructed of mild steel concrete filled in accordance with the standard detail drawings.

Where indicated as being kerb inlet type the gullies shall conform to the shape and dimensions given on the detail drawings supplied.

Pre- cast concrete manhole and inspection chambers

Concrete Cylindrical Pipes and Fitting including Manholes, Inspection Chambers and Street Gullies and they shall carry the relevant Standard Institution registered certification trade mark, or test certificates shall be furnished by the manufacturer.

Pre- cast concrete gullies

Pre- cast concrete gullies shall be un-reinforced Concrete Cylindrical Pipes and fittings including Manhole, Inspection Chambers and Street Gullies.

Valve Chamber and Manhole step iron

Steps irons of general –purpose type shall comply in all respects with malleable Step Irons.

Timber

Timber shall be sound, well seasoned and entirely free from worm, beetle, warps, shakes, splits and all forms of rot and deadwood. Where required, all timber shall be treated with creosote. Coal Tar Creosote for the preservation of Timber or an alternative approved timber preservative.

Water bars

Water bars shall be "Dumbbell" type and be of natural or synthetic rubber or extruded PVC. They shall be flexible, tough, elastic and durable and of dimensions detailed. They should be unaffected on contact with dilute acids or alkalis. Joints and junctions shall, when possible, be prefabricated by the manufacturer's instruction including recommended adhesive shall be followed and used. Samples shall be submitted for approval of the Engineer before use of any material.

Concrete blocks

All solid and hollow concrete blocks used in the walling must be capable of withstanding a crushing pressure of not less than 0.35 per square millimeter after 29 days. The blocks shall be cast in metric sizes.

Plumbing materials

Galvanized mild steel pipes

Galvanized mild steel pipes and fittings shall comply with BS 1387 Class B or "Medium Grade". Threading for screwed and socketed joints shall be in accordance with the requirements of BS 21. Joints shall be made with an approved pipe-jointing compound in accordance with the manufacturer's instructions. Red lead compounds shall not be used. Joints in underground piping shall be coated with bitumen or other approved composition.

Fittings for galvanized pipes

All fittings for galvanized steel water pipe work shall be galvanized heavy weight fittings in accordance with BS 1740. Fittings for waste pipe work shall be galvanized

malleable iron complying with the requirements of BS 143. Brass or gunmetal fittings shall be subject to the approval of the Engineer.

CONCRETE WORKS

General

a) Code of practice

All workmanship, materials, tests and performances in connection with the reinforced concrete work are to be in conformity with the latest edition of the followings

- b)** British Standard Code of Practice (C.P. 114 for “Structural Use of Concrete”) where not inconsistent with these specifications.

British Standard Code of Practice B.S 5337 “ the design and construction of reinforced concrete structures for the storage of liquids

- c)** Appropriate Ministry of Works Standards in any or in their absence appropriate British Standards Contractor’s plant

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

After completion of installation, the operation of the plant and equipment shall be subject to the approval of the Engineer.

Materials

Cement

Cement, unless otherwise specified, shall be Portland cement of the Blue Triangle brand, or Bamburi Portland Cement brand. Any other brand must be approved by the Engineer and shall comply with the requirements of B.S. 12 with the exceptions that it may contain reactive volcanic ash (of not more than 10% of total weight) and the quantity of insoluble residue permitted in B.S. 12 may be exceeded. A manufacturer’s Certificate of Test in accordance with B.S. shall be supplied for each consignment delivered to site.

Should the Contractor require using cement of the rapid hardening variety, he shall obtain the approval of the Engineer and also obtain any instructions regarding the modifications to the preambles caused thereby. Any additional cost that may be caused by the use of the rapid hardening cement shall be at the Contractor's expense.

Cement may be delivered to site either in bags or in bulk. If delivered in bags, each bag shall be properly sealed and marked with the manufacturer's name and on the site is to be stored in a weather-proof shed of adequate dimensions with a raised floor. Each consignment shall be kept separate and marked so that it may be used in the sequence in which it was received. Any bag found to contain cement which has set or partly set shall be completely discarded and not used in the Works. Bags shall not be stored more than 1500 mm in height.

If delivered in bulk the cement shall be stored in a weather-proof silo either provided by the cement supplier or by the Contractor, but in either case the silo shall be to the approval of the Engineer.

Aggregates

The aggregates shall conform to the requirements of B.S. 882 and the sources and all types of all aggregates are to be approved in all respects by the Engineer before work commences.

The grading of aggregates shall be one within the limits set out in B.S. 882 and as later specified and the grading, once approved, shall be adhered to throughout the Works and not varied without the approval of the Engineer. Fine aggregate shall be clean, coarse, siliceous sand of good, sharp, hard quality and shall be free from lumps of stone, earth, loam, dust, salt, organic matter and any other deleterious substances. It shall be graded within the limits set out in zone 1 or 2 of B.S. 882.

Coarse aggregate shall be good, hard, clean approved black trap or similar stone, free from dust, decomposed stone, clay, earthy matter, foreign substances or friable thin elongated or laminated pieces. It shall be graded within the limits of Table 1 of B.S. 882 for its respective nominal size.

If in the opinion of the Engineer the aggregate meets the above requirements, but is dirty or adulterated in any manner it shall be screened and/or washed with clean water if he so directs at the Contractor's expense.

Aggregates shall be delivered to the site in their prescribed sizes or grading and shall be stockpiled on paved areas or boarded platforms in separate units to avoid intermixing.

Fine aggregate

Fine aggregate shall be sand free from impurities and complying with British Standard No. 882.

Grading zone 2 of Table 2.

Coarse aggregate

Coarse aggregate shall be hard crushed rock free from impurities and complying with British Standard No. 882 "graded aggregate" 20 mm to 5 mm nominal size as Table 1.

Water for mixing concrete

Water for concrete shall be free from impurities, complying with BS 3148. Water for washing and curing shall be such that it will not impair neither the strength of the finished concrete nor its appearance.

Hardcore

Hardcore for filling under floors shall be good, hard stone ballast or quarry waste, to the approval of the Engineer, broken to pass through not greater than a 150 mm ring or to be 75% of the finished thickness of the layers being compacted, whichever is the lesser. Hardcore shall be free from all weeds, roots, vegetable soil, clay, black cotton soil or other unstable materials.

It shall be graded with smaller stones and fine materials to give a dense compact mass after consolidation. Sufficient fine material shall be added to each layer to give gradation of material as necessary to obtain a solid compact mass after rolling. Hardcore filling is to be laid in layers each of a consolidated thickness not exceeding 250 mm. Each layer shall be compacted by at least 8 passes of a 10-tonne smooth-wheeled roller or a 2-tonne vibrating roller until all movement ceases. Sufficient water is to be added to obtain maximum compaction to the Engineer's approval. To each layer a 25 mm thick layer of sand complying with the specification of fine aggregate for concrete shall be spread over the surface and forced into the hardcore by the use of a vibrating roller weighing not less than 2 tones. This operation should be carried out when the materials are dry and repeated whilst the sand is well watered. Should all the sand be absorbed the Engineer may require a further layer to be applied and the process repeated.

The top surface of the hardcore shall be leveled or graded to fall as required, and shall then be blinded with a layer of similar material broken to 25 mm gauge and finished

with a 10-tonne smooth-wheeled roller. The surface so obtained shall be to the Engineer's approval.

Compacted hardcore

The sub-grade shall be compacted by a smooth-wheeled roller of 8 to 10 tonnes weight or the vibrating roller of minimum 1300 Kg., or other approved plant. The number of coverage shall be at least 10 and there shall be a 50% overlap of successive coverage. If so instructed by the Engineer, water shall be added during compaction to obtain optimum water content. Filling shall be compacted as above but in maximum 200 mm deep layers.

Sand

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

Finishes

General

The Contractor will be required from an early stage in the Contract to prepare samples, for the approval of the Engineer, of the various concrete finishes specified hereafter. Samples are to be prepared using the same materials and the same methods of construction, compaction, curing, etc. as the Contractor proposes to use for executing the full quantity of the work. A record of the mix, water content, method of compaction, any additives used, etc., is to be kept for each sample prepared. When the Engineer has approved a sample it will be kept on site in an approved location. The finishes in construction will be expected to be up to a standard equal to the approved sample. Consistency in cement colour, and the colour, grading and quality of aggregates must be maintained in all finished concrete work.

Mortars

Cement mortar shall consist of one part of Portland cement to three parts sand by volume. The cement/lime mortar shall consist of one part of Portland cement, one part of lime and six parts of sand by volume.

The ingredients of mortar shall be measured in proper gauge boxes on a boarded platform, the ingredients being thoroughly mixed dry, and again whilst adding water.

In the case of cement/lime mortar, sand and lime shall be mixed first and then the cement added.

All mortar is to be thoroughly mixed to a uniform consistency with only sufficient water to obtain a plastic condition suitable for troweling. No mortar that has commenced to set is to be used or re-mixed for use.

Tamped finish

Areas so specified shall be finished at the time of casting with a tamped finish to the Engineer's approval produced by an edge board. Board marks are to be made to a true pattern and will generally be at right angles to the traffic flow. Haphazard or diagonal tamping will not be accepted.

Fair face

Fair face surfaces shall be clean, smooth, even, true to form, line and level, and free from all board marks, joint marks, and honeycombing, pitting, and other blemishes. Forms are to be provided with a smooth lining of plywood, steel, or other approved material which will achieve the required finish without any general rubbing down. Rubbing down will only be permitted to remove any projecting fins at corners or joints.

Fine face

Fine face surfaces shall be for Fair face above, but to a higher standard obtained from forms provided with an impervious sheet lining of metal or plastics faced plywood in large panels arranged in an approved pattern. Rubbing down shall only be permitted after an inspection by the Engineer. The finished surfaces shall be capable of receiving a painted finish.

Chisel-dressed finish

Chisel-dressed finish is to be carried out on any grade of concrete but not until it is at least 30 days old. The surfaces are to be fully chisel-dressed to remove a maximum of 12 mm (average 9 mm) of the surface by shearing and exposing the aggregate without excessive cracking of the surrounding matrix. Arises of columns, beams, etc., are pre-formed fair face with timber fillets set in the formwork and care must be taken in working up to these to preserve a clean line.

For vertical surfaces of walls and columns particular care must be taken to remove all sharp projections. For beam soffits this requirement is not necessary. All surfaces

requiring this treatment are to have margins chisel-dressed by hand for a minimum width of 75 mm commencing from the fillet edge. Thereafter, mechanical chisel-dressing may be used, but the Contractor must ensure that a uniform texture and even plane surface is achieved. The use of sharply pointed steel tools for both hand and mechanical chisel-dressing is essential. Upon completion the surfaces are to be thoroughly wire brushed and washed down.

Protection of finishes

Wherever possible, in-situ exposed concrete finishes should be commenced at the highest level and worked progressively down the building. Precaution shall be taken to avoid staining or discoloration of previously finished concrete faces by leakage of grout from newly placed concrete. The Contractor shall, during all stages of construction, adequately protect all concrete finishes from Damage by leaking grout, knocking, paint stains, falling plaster, etc. In cases of balustrade walls to staircases and members where Damage is otherwise likely, concrete finishes shall be protected by cladding with timber, celotex, or other approved sheeting. All Sub-Contractors shall be informed accordingly on the precautions to be taken.

Blinding

All blinding concrete to be 1:3:6, or as otherwise instructed by the Engineer in writing.

Formwork

The method and system of formwork which the Contractor proposes to use shall be approved of by the Engineer before construction commences. Formwork shall be substantially and rigidly constructed of timber or steel or pre-cast concrete or other approved material.

All timber for formwork shall be good, sound, clean, sawn, well-seasoned timber, free from warps and loose knots and of scantings sufficiently strong for their purpose.

Construction of formwork

All formwork shall be of sufficient thickness and with joints close enough to prevent undue leakage of liquid from the concrete and fixed to proper alignment, level and plumb and supported on sufficiently strong bearers, shores, braces, plates e.t.c. properly held together by bolts or other fastenings to prevent displacement, vibration or movement by the weight of materials, men and plant on same and so wedged and clamped as to permit easing and removal of the formwork without jarring the concrete. Where formwork is supported on previously constructed portions of the reinforced

concrete structural frame, the Contractor shall by consultation with the Engineer ensure that the supporting concrete is capable of carrying the load and/or sufficiently propped from lower floors or portions of the frame to permit the load to be temporarily carried during construction.

Soffits shall be erected with an upward camber of 5 mm for each 5 meters of horizontal span or as directed by the Engineer.

Great care shall be taken to make and maintain all joints in the formwork as tight as possible, to prevent the leakage of grout during vibration. All faulty joints shall be caulked to the Engineer's approval before concreting. The formwork shall be sufficiently rigid to ensure that no distortion or bulging occurs under the effects of vibration. If at any time the formwork is insufficiently rigid or in any way defective the Contractor shall strengthen or improve such formwork as the Engineer may direct.

The Contractor's attention is drawn to the various surface textures and applied finishes required and the faces of formwork next to the concrete must be of such material and construction and be sufficiently true to provide a concrete surface which will in each particular case permit the specified surface treatment or applied finish.

All surfaces which will be in contact with concrete shall be oiled or greased to prevent adhesion of mortar. Oil or grease shall be of a non-staining mineral type applied as a thin film before the reinforcement is placed. Surplus moisture shall be removed from the forms prior to placing of the concrete.

Temporary openings shall be provided at the base of columns, wall and beam forms and at any other points where necessary to facilitate cleaning and inspection immediately before the pouring of concrete. Before the concrete is placed the shuttering shall be trued-up and any water accumulated therein shall be removed. All sawdust, nails, chips and other debris shall be washed out or otherwise removed from within the formwork. The reinforcement shall then be inspected for accuracy of fixing. Immediately before placing the concrete the formwork shall be well wetted and inspection openings shall be closed. The erection, easing, striking and removing of all formwork must be done under the personal supervision of a competent foreman, and any Damage occurring through faulty formwork or its incorrect removal shall be made good by the Contractor at his own expense.

After removal of formwork, all projections, fins etc., on the concrete surface shall be chipped off, and made good to the requirements of the Engineer. Any voids or honeycombing shall be treated as described in "Faulty Concrete".

Stripping formwork

All formwork shall be removed without undue vibration or shock and without Damage to the concrete. No formwork shall be removed without the prior consent of the Engineer and the minimum periods that shall elapse between the placing of the concrete and the striking of the formwork will be as follows:

Beam sides, wall and columns 2 days

Slab Soffits (props left under) 3 days

Beam Soffits 7 days

Removal of props (partly subject to 7 days concrete cube strength being satisfactory) to:

Slabs 10 days

Beams 14 days

Cantilevered Beams and Slabs 28 days

If the Contractor wishes to take advantage of the shorter stripping times permitted for beams and slab soffits when props are left in place, he must so design his formwork that sufficient props are agreed with the Engineer can remain in their original positions without being moved in any way until the expiry of the minimum time for removal of props. Stripping and re-propping will not be permitted.

The above times may be reduced in certain circumstances, at the discretion of the Engineer provided an approved method is adopted at the Contractor's expense to ensure that the required concrete strength is attained before the forms are stripped.

Solid strips in composite slabs shall be considered as beams. The tops of retaining walls shall be adequately supported with stout raking props at intervals required by the Engineer. These props are not to be removed until 7 days after casting of the floor slab is over.

Supporting props to wall and beam soffits

When directed by the Engineer, supporting props to wall and beam soffits are to be left in position until the completion of the whole of the reinforced concrete structure. The props are to be to the approval of the Engineer and the Contractor must submit the suggested method of propping to the Engineer prior to removal of formwork to the relevant surfaces.

Concrete mixes

Class	Nominal mix	Trial strength in N/mm ²		where used in this contract
		7 days	28 days	
15	1:3:6	13	19.5	surround to pipes
25	1:2:4	25	32.5	Structural concrete walls

Concrete mixing and placing

The concrete shall be mixed only in approved power-driven mixers of a type and capacity suitable for the work, and in any event not smaller than 0.04/0.28 cu.m. capacity. The mixer shall be equipped with an accurate water measuring device. All materials shall be thoroughly mixed dry before water is added and the mixing of each batch shall continue for a period of not less than two minutes after the water has been added and until there is a uniform distribution of the materials and the mass is uniform in colour.

The entire contents of the mixed drum shall be discharged before recharging. The volume of mixed material shall not exceed the rated capacity of the mixer. Whenever the mixer is started, 10% extra cement shall be added to the first batch and no extra payment will be made on this account.

As a check on concrete consistency slump tests may be carried out and shall be in accordance with B.S. 1881. The Contractor shall provide the necessary apparatus and carry out such tests as are required. The slump of the concrete made with the specified water content, using dry materials, shall be determined and the water to be added under wet conditions shall be so reduced as to give approximately the same slump.

The concrete shall be mixed as near to the place where it is required as is practicable, and only as much as is required for a specified section of the work shall be mixed at one time, such sections being commenced and finished in one operation without delay. All concrete must be efficiently handled and used in the Works within twenty (20) minutes of mixing. It shall be discarded from the mixer direct either into receptacles or barrows and shall be distributed by approved means which do not cause separation or otherwise impair the quality of the concrete. Approved mechanical means of handling will be encouraged, but the use of chutes for placing concrete is subject to prior approval of the Engineer.

Concrete shall be placed from a height not exceeding 1,500 mm directly into its permanent position and shall not be worked along the shutters to that position. Unless otherwise approved, concrete shall be placed in a single operation to the full thickness

of slabs, beams, and similar members, and shall be placed in horizontal layers not exceeding 1,500 mm deep in the walls and similar members.

Concrete in columns may be placed to a height of 4 meters with careful placing and vibration and satisfactory results. Where the height of the column exceeds 4 meters suitable openings must be left in the shutters so that this maximum lift is not exceeded.

Concrete shall be placed continuously until completion of the part of the work between construction joints as specified hereinafter or of a part of the approved extent. At the completion of a specified or approved part a construction joint of the form and in the positions hereinafter specified shall be made. If stopping of concrete be unavoidable elsewhere, a construction joint shall be made where the work is stopped. A record of all such joints shall be made by the Contractor and a copy supplied to the Engineer.

Any accumulation of set concrete on the reinforcement shall be removed by wire brushing before further concrete is placed. The Contractor shall provide runways for concreting to the satisfaction of the Engineer. Under no circumstances will the runways be allowed to rest on the reinforcement. Care shall be taken that the concrete is not disturbed or subjected to vibrations and shocks during the setting period. Mixing machines, platforms and barrows shall be clean before commencing mixing and be cleaned on every cessation of work. Where concrete is laid on hardcore or other absorbent materials, the base shall be suitable and sufficiently wetted before the concrete is deposited.

Works cube tests

Work cubes are to be made at intervals as required by the Engineer in accordance with C.P. 114, and the Contractor shall provide a continuous record of the concrete work. The cubes shall be made in approved 150 mm moulds in strict accordance with the Code of Practice. Three cubes shall be made on each occasion. 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 made
- c) Location in work
- d) 7-Day Test, Date, Strength
- e) 28-Day Test, Date, Strength

Cubes shall be forwarded, carriage paid, to an approved Testing Authority, in time to be tested two at 7 days and the remaining one at the discretion of the Engineer. No cube shall be dispatched within three days of casting. Copies of all Works Cube Tests shall

be forwarded to the Engineer and one shall be retained on site. If the strengths required above are not attained and maintained during the carrying out of the Contract, the Contractor will be required to increase the proportion of cement and/or substitute better aggregates so as to give concrete which does comply with the requirements of the Contract. The Contractor may be required to remove and replace at his own cost any concrete which fails to attain the required strength as ascertained by Works Cube Tests.

Compaction

At all times during which the concrete is being placed, the Contractor shall provide adequate trained and experienced labour to ensure that the concrete is compacted in the forms to the satisfaction of the Engineer. Concrete shall not be placed at a rate greater than will permit satisfactory compaction or to a depth greater than 400 mm before it is compacted.

During and immediately after placing, the concrete shall be thoroughly compacted by means of continuous tamping, spading, slicing and vibration. Vibration is required for all concrete of classes 40, 35, 25, and 20. Care shall be taken to fill every part of the forms, to work the concrete under and around the reinforcement without displacing it to avoid disturbing recently placed concrete which has begun to set. Any water accumulating on the surface of newly placed concrete shall be removed and no further concrete shall be placed thereon until such water is removed.

Internal vibrators shall be of a frequency not less than 7000 cycles per minute and shall have a rotating eccentric weight of at least 0.05 Kg. with an eccentricity of not more than 12 mm. Such vibrators shall visibly affect the concrete within a radius of 250 mm from the vibrator. 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 the vibrators and reinforcement, and vibrators and formwork shall be avoided. Internal vibrators shall be inserted vertically into the concrete at not more than 500 mm centers and shall be moved constantly from place to place. No internal vibrator shall be permitted to remain in any one position for more than ten seconds and it shall be withdrawn very slowly from the concrete.

In consolidating each layer of concrete the vibrating head shall be allowed to penetrate and re-vibrate the concrete in the upper portion of the underlying layer. In the area where newly placed concrete in each layer joins previously placed concrete more than usual vibration shall be performed, the vibrator penetrating deeply at close intervals along these contacts. Layers of concrete shall not be placed until layers previously placed have been vibrated thoroughly as specified. Vibrators shall not be used to move concrete from place to place in the formwork.

At least one internal vibrator shall be of the high frequency, low amplitude type applied with the principal direction of vibration in the horizontal plane. They shall be attached directly to the forms at no more than 1200 mm centers. In addition to internal and external vibration the upper surface of suspended floor slabs shall be leveled by tamping or vibrating to receive finishes. Vibrating elements shall be of the low frequency high amplitude type operating at a speed of not less than 3000 r.p.m.

Curing and protection

Care must be taken that no concrete is allowed to become prematurely dry and the fresh concrete must be carefully protected, within two hours of placing, from rain, sun and wind by means of Hessian sacking, polythene sheeting, or other approved means. This protective layer and the concrete itself must be kept continuously wet for at least 7 days after the concrete has been placed. The Contractor will be required to provide complete coverage of all fresh concrete for a period of 7 days. Hessian or polythene sheeting shall be in the maximum widths obtainable and shall be secured against wind. The Contractor will not be permitted to use old cement bags, Hessian or other materials in small pieces.

Concrete in foundations and other underground work shall be protected from admixture with falling earth during and after placing. Traffic or loading must not be allowed on the concrete until the concrete is sufficiently matured, and in no case shall traffic or loading be of such magnitude as to cause deflection or other movement in the formwork or Damage to the concrete members. Where directed by the Engineer props may be required to be left in position under slabs and other members for greater periods than those specified hereafter.

Faulty concrete

Any concrete which fails to comply with these specifications, or which shows signs of setting before it is placed shall be taken out and removed from site. Where concrete is found to be defective after it has set, the concrete shall be cut out and replaced in accordance with the Engineer's instructions. On no account shall any faulty, honeycombed, or otherwise defective concrete be repaired or patched until the Engineer has made an inspection and issued instructions for the repair. The whole cost whatsoever, which might be occasioned by the need to remove faulty concrete, shall be borne by the Contractor.

Pre-cast units

Pre-cast reinforced concrete slabs to be made to sizes as shown in the Drawings. Slabs to be cast with Grade 25 concrete in approved formwork, suitably vibrated and cured for 28 days before use.

REINFORCEMENT

Steel

Reinforcement shall be;

- (a) High deformed steel bars conforming to B.S 4449
- (b) Fabric reinforcement conforming to B.S 4483

The contractor shall obtain from his suppliers certificate of the mechanical and physical properties and shall submit the to the Engineer for approval

General Reinforcement

The following clauses concerning joints give details of reinforcement required at such locations.

This clause deals with other reinforcement in external road and drainage slabs.

The top reinforcement layer shall have 50 mm cover unless otherwise permitted and shall terminate 40-80 mm from edges and joints. Mesh fabric shall have main bars longitudinal.

At transverse laps between sheets of mesh fabric the first transverse bar of one sheet shall lie within the last complete mesh of the previous sheet. No overlap will be required longitudinally between sheets.

Unless detailed otherwise, all corners of box-outs for manholes etc. shall be provided with 12 mm bars 1200 mm long across and bisecting the corner angle in the slab where that angle exceeds 40°. These bars may lie on any top reinforcement, which may be depressed locally to maintain cover to these crack control bars. In unreinforced slabs such bars shall have 50 mm cover.

Similarly at corners of slabs having no load transfer bars to other slabs, 10 mm bars shall be positioned to prevent cracking across the corner. At a 90o corner one bar shall be L-shaped with equal 1500 mm legs with hooked ends. A similar V-shaped bar with an

internal angle of 30° shall be placed to bisect the corner angle with its apex also in the corner.

Bending and placing reinforcement

Reinforcement shall be cleaned before placing and secured with space blocks in the correct position. It shall be bound with suitable wire and have such cover as shown on the drawings.

Strength of reinforcement

Characteristic strengths of reinforcement are as given in B.S. 4449, 4461, and 4483. lxxx.
Rod reinforcement

The steel reinforcement shall comply with the latest requirements of the following British Standards:-

Hot Rolled bars for the Reinforcement of concrete to B.S. 4449 (metric units)

Cold worked steel for the reinforcement of concrete to B.S. 4461 (metric units)

The Contractor will be required to submit a test certificate of the rolling. Reinforcement shall be stored on racks above ground level. All reinforcement shall be free from loose mill scale or rust, grease, paint or other substances likely to reduce the bond between the steel and the concrete.

BRC

The BRC should be electrically cross-welded steel wire mesh reinforcement to B.S. 4483: 1969, or as directed by the Engineer, and of the size and weight specified in the Drawings.

The fabric shall be free from scale, dust, rust, grease or other substance likely to reduce the bond between the steel and the concrete and shall be laid with a minimum 300 mm laps and bound with No. 18 S.W.G. annealed iron wire.

Fixing reinforcement

Reinforcement shall be accurately bent to the shapes and dimensions shown on the Drawings and in accordance with B.S. 4466 (1969). Reinforcement must be cut and bent cold and no welded joints will be permitted, unless so detailed. Reinforcement shall be accurately placed as shown on the Drawings, and before and during concreting, shall

be secured against displacement by using No. 18 S.W.G. annealed binding wire or suitable clips at intersections, and shall be supported by concrete or metal supports, spacers or metal hangers to ensure the correct position. No concreting shall be commenced until the Engineer has inspected the reinforcement in position and until his approval has been obtained and Contractor has given two clear days" notice of intention to concrete.

The Contractor is responsible for maintaining the reinforcement in its correct position, according to the drawings, before and during concreting. During concreting, a competent steel fixer must be in attendance to adjust and correct the position of any reinforcement which may be displaced. The vibrators are not to come into

Position and correctness of reinforcement

Irrespective of whether any inspection and/or approval of the fixing of the reinforcement has been carried out as in C above, it shall be the Contractor's sole responsibility to ensure that the reinforcement complies with the details on the Drawings and is fixed exactly in the positions shown therein and in the positions to give the prescribed cover. The Contractor will be held entirely responsible for any failure or defect in any portion of the reinforced concrete structure and including any consequent delay, claims, third party claims. etc., where it is shown that the reinforcement has been incorrectly positioned or is incorrect in size or quantity with respect to the detailed Drawings.

Concrete cover to reinforcement

Unless otherwise directed, the concrete cover to rod reinforcement over main bars in any face shall be:-

Foundations against blinding	50 mm
Strip foundations	40 mm
Columns/Floor slab	40 mm
Beams	25 mm

Projecting reinforcement

Where reinforcement projects from a concreted section of the structure and this reinforcement is expected to remain exposed for some time, it is to be coated with a cement grout to prevent rust staining on the finished concrete. This grout is to be brushed off the reinforcement prior to the continuation of concreting.

Fixtures

No openings, chases, holes or other voids shall be formed in the concrete without the prior approval of the Engineer. Details of any fixtures to be permanently built into the concrete including the proposed position of all electrical conduits 25 mm and over in diameter shall be submitted to the Engineer for his approval before being placed.

Chases, holes, etc., in concrete

The Contractor shall be responsible for the co-ordination with the Electrical and other Sub-Contractors for incorporating electrical conduits, pipes, fixing blocks, chases and holes in concrete members as required and must ensure that adequate notice is given to such Sub-Contractors informing them when concrete members incorporating the above are to be poured. The Contractor shall submit full details of these items to the Engineer for approval before the work is put in hand. All fixing blocks, chases, holes, etc., to be left in the concrete shall be accurately set out and cast with the concrete. Unless otherwise instructed by the Engineer, all electrical conduit to be positioned within the reinforced concrete shall be fixed inside the steel cages of beams and columns and between the top and bottom steel layers in the slabs and similar members.

The proposed position of all electrical 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 Engineer, whose approval shall be obtained before any such conduit is placed

PIPEWORK

U.P.V.C. pipes and fittings

U.P.V.C pipes and fittings shall comply with BS 3505.

U.P.V.C pipes up to 50-mm diameter shall be jointed with solvent cement joints in accordance with the manufacturer's instructions. Pipes having diameter larger 50 mm shall be jointed using approved flexible mechanical joints.

All tees, reducers, sockets flange etc. of any diameter are to be jointed to pipes with solvent cement joints.

All jointing and laying of U.P.V.C pipes and fittings shall be carried out strictly in accordance with the manufacturer's instructions.

Steel pipes

Steel pipes shall be to BS 3601

Sluice valves

Flanged sluice valves shall confirm to BS 1218 or B.S 5163 whichever is applicable

Sluice valves shall have heads for key operation unless otherwise stated.

Valves shall be securely fixed with the spindle in vertical position, unless otherwise stated. They shall be checked for ease of operation and water tightness. Valve glands shall be repacked if necessary.

Unless otherwise stated, sluice valves should be able to withstand the working pressure of the class of pipe adjoining the valve.

All sluice valves shall be double flanged, with flanges faced and drilled and to conform to the manufacturer's dimensions or those specified in B.S 4504.

All sluice valves shall be suitable for opening and closing by manual operation against the unbalanced heads stated in meters water column.

Air valves

Air valves shall be of cast iron conforming to BS 1452, grade 14. They shall be suitable for working pressures not less than the specified for the class of pipe specified. To which they are connected.

Air valve shall be of the single acting type for the automatic admission and discharge of either large quantities of air during emptying or filling or small quantities of air under pressure during normal working condition of the pipeline.

Each air valve shall be complete with an isolating valve and cork.

All double orifice air valves shall be flanged. Flanges shall be faced and drilled and shall conform to the dimensions specified in B.S 4504 table for NP 10 unless otherwise stated.

All double orifice air valves shall be supplied drilled with a 20. Dia. Hole tapped pipe. Thread suitable for fixing of pressure gauge hole shall be fitted with brass screwed plug and copper compression ring casket.

Manufacturer's instructions.

The Contractor shall be responsible for obtaining copies of any manufacturer's instructions for pipes jointing and shall familiarizes himself and his employees with these instructions.

All necessary tools and equipment required for the laying, jointing and testing of pipes and joints shall be provided by the Contractor at no extra costs.

Step Irons

Step irons shall be galvanized malleable iron and shall comply with B.S 1247.

Surface Boxes

Surface boxes shall confirm to B.S 1426.

Trench excavation.

Excavated material shall be placed tidily and compactly at the sides of the trench so as to occupy as little space as possible and to create as little nuisance as possible.

The bottom of the trench shall be absolutely smooth and completely free from stones and sharp objects so as to ensure that the pipes rest uniformly upon original ground throughout its length.

Backfilling with excavated material beneath the pipe at low spots will not be permitted.

Excavation below the bottom of the trench at pipe joints must be kept to a minimum.

If the bottom of the trench materials that is unsuitable for pipe laying, the Engineer may instruct the Contractor to excavate below formation level and backfill to formation with suitable approved material properly compacted.

No pipe laying is to take place until the bottom of the trench is carefully examined by the engineer's representative.

Minimum trench depth

The minimum depth for pipe trenches shall be that which provides a cover of 600 mm above the top of the pipe.

Backfilling in pipe trenches

Backfilling around the pipe and to a height of 300 mm above it is to be carried out by using material that is free from stones and carefully compacted in layers not exceeding 150 mm thick.

Backfill to trenches shall be properly compacted and subsequent subsidence shall be the Contractor's responsibility and shall make it good at his own expense.

All topsoil shall be kept aside during excavation and be replaced after backfilling.

All surplus material from the excavations shall be disposed.

Removal of timbering

All timbering materials shall be removed from trenches before or during backfilling unless, in the opinion of the Engineer, its removal will cause any subsidence in which case he may instruct the Contractor to backfill leaving the timbering in place.

Reinstatement

Immediately backfilling of trenches has been completed, temporary reinstatement of the ground surface shall take place.

When in the opinion of the Engineer's representative a suitable period as elapsed after the temporary reinstatement and expects no further settlement, he shall allow the Contractor to carry out the permanent reinstatement. This shall in any way relieve the Contractor of his responsibility for the reinstatement and, should any further unforeseen settlement take place, the Contractor will be required to make good the reinstatement at his own expense.

Permanent reinstatement means the ground surface shall be restored to its original form and condition.

Handling and storing pipes

Particular care shall be taken during loading, unloading, handling and transportation to avoid distortion, flattening, denting, scoring or any damage to external or internal coating, sheathing or lining of the pipes, fittings, etc.

Pipes shall be stacked clear of the ground on the timbers of adequate dimensions to prevent damage to the pipes and successive tiers shall be separated by timber of similar dimensions. Wooden wedges shall be fixed to these timbers to prevent the wedges from rolling.

Fittings etc. shall be stacked clear of the ground on timbers not more than 1 tier high.

All valves rubber joint rings, gaskets, nuts, bolts, washers and similar fittings shall be stored in approved locked premises and shall not be distributed to the trench until immediately prior to fixing. All rubber joint rings and gaskets must be stored in a cool place.

All UPVC pipes and fitting should be stored under cover and protected from the weather to the satisfaction of the Engineer.

Examination of pipes

Before laying each pipe must carefully be examined for damage. Any defects in the external coating or internal lining shall be made good. The pipes shall be carefully examined for cracks or chipped ends. Damaged ends shall be cut off beyond the damaged area and machined true.

All pipes shall be cleaned internally before laying.

Laying of pipes

All pipes shall be laid strictly to the lines, levels and gradients as shown on the drawings unless where otherwise directed by the Engineer.

Mains shall be boned to even gradients using site rails no dips or bumps permitted.

All pipes shall be solidly bedded on the trench bottom. Joint holes shall be as small as possible and filled in compactly before the refilling of the trench commences.

The Contractor shall make full allowance for all cuttings and jointing of pipes.

Surface water

No surface water or other extraneous matter shall be allowed to enter the pipes during or after laying. Should this happen, the Contractor shall arrange for the necessary cleaning of the pipe at his own expense.

Painting of exposed pipes, valves, fittings and metalwork

All pipes, valves, tubes, manhole covers and the like, that are left exposed to the air at river crossings, in manholes, chambers etc., except where galvanized, shall be thoroughly cleaned and painted with two coats of approved bituminous paint after erection.

Testing of pipes

All pipes and apparatus that are to contain water under pressure shall be tested to the working pressure plus 50 %. If the pipes are in the trench they shall be backfilled for the two thirds of the distance between joints, leaving joints exposed. The fill shall be a minimum of 450mm deep.

Testing shall take place in the presence of the Engineer's representative as the work proceeds, test lengths being approved by the Engineer. The maximum length of the pipe laid without pressure testing must not exceed 3 km.

Pipes shall be securely anchored and pipe ends shall be closed by means of caps or blank flanges. Sluice valves shall not be used at the end of a test length.

The Contractor shall give the Engineer's representative a minimum of 24 hours' notice of his intention to carry out a test.

All water, materials and apparatus for carrying out the tests are to be provided by the Contractor at no extra cost.

The procedure for testing is as follows.

- (a) The test length shall be filled with water and brought to the required test pressure by means of a pressure pump. When the required is obtained, indicated by an approved pressure gauge, the pump shall be disconnected, and the pressure of the water watched for a period of 60 minute, any drop in pressure being carefully monitored.
- (b) If there is a drop in pressure at the end of the 60 minutes period, the pump should be reconnected and the test pressure re-established. The pump should then be disconnected and the pressure lowered immediately by bleeding off the water from the mains through a tap into a container. When the pressure reaches the same pressure that was indicated at the end of, the 60 minutes test period, the tap is closed and the amount of water collected in the container is measured. This amount of water is

the leakage and for the test to be successful must not be greater than the “allowable leakage” as calculated below.

$$\text{Allowable leakage (litres)} = \frac{d \times l \times p}{1,227,000}$$

Where d -diameter of pipe (mm)
l -length of pipe under test (m)
p-average pressure in pipe (m).

(a) If the test fails, it is the Contractor’s responsibility to locate the leak and remedy it so that the pipeline passes the test.

Sterilization

Treated water mains should be washed out and sterilized before being put into service. Sterilization should consist of introducing water containing a quantity of chlorine such that there is a concentration of chlorine throughout the mains at not less than 30 parts per million. This solution is to remain in the pipeline for a period of 24 hours after which the main shall be thoroughly flushed out with water to be used for the supply.

The inside of water retaining structures shall, after being thoroughly cleaned, be filled to overflow level with water containing 20 parts per million of chlorine and left for at least 24 hours before flushing out.

After flushing, bacteriological samples of water shall be taken in accordance with the Engineers instructions. If any of the samples proves to be inferior to that of the supply water, the sterilization and flushing shall be repeated.

All costs of sterilization shall be the Contractor’s responsibility. The cost of sampling and testing shall be the responsibility of the employer if successful but if not shall be borne by the Contractor.

Concrete surround for pipes

Bed the draw off pipe and surround it with Class 15 concrete as specified. The sequence of work will involve:

- (a) Lay the Concrete bed
- (b) Lay, and joint the pipes on the Concrete bed.
- (c) After the pipes have been tested complete the Concrete surround.

Penstock

All penstock shall be of the flat back type and shall be drop tight when tested to a minimum face pressure of 1.0 bar

Penstock frames and doors are to be of best quality cast iron complying with B.S 1452 with two annular gunmetal sealing faces on frame and door. The gunmetal shall comply with the requirement of B.S 1400

All screw penstocks shall be provided with mild steel spindle screwed from anti-clockwise opening and running in a gunmetal nut housed in a suitable head gear which shall have hand wheel for operation. The extended spindle shall be of cadmium plated mild steel with protection tubes; wherever their lengths so required steadying brackets shall be provided

All penstock shall be supplied complete with all necessary nuts, bolts or studs and washers for fixing in position.

All headstocks shall have forged steel rod and be complete with gunmetal index pointer working over polished and graduated gunmetal indicator plate fixed to the side of the pillar. The distance from the base to the center of the operating hand shall not be less than 0.8m.

BUILDING'S WORKS

Damp proofing

Damp proof courses shall protrude beyond the outer face of the wall for a minimum of 25 mm, the last 10 mm of which shall be turned down on an approved profile to form an anti-rain lip. The material shall be laid on a cement screed troweled smooth. At all angles, intersections etc. the material must be lapped not less than 75 mm.

A damp proof membrane of 500 gauge polythene shall be laid under floor slabs where indicated on the Drawings or directed by the Engineer and shall have laps of not less than 200 mm at all joints.

Bonding to concrete

All doorframes shall be fixed with holdfasts screwed to the frames one end and built into blockwork or concrete at the other end. Alternatively, holdfasts may be formed as an integral part of metal doorframes. Doorframes shall have three holdfasts at each side.

The holdfasts shall be of 6 mm x 25 mm galvanized wrought iron 200 mm long, one end turned up, twice drilled and countersunk for screwing to frames with stout screws and the other end formed swallowtail for building into brickwork etc.

Bonding ties shall be of 6 mm x 15 mm galvanized wrought iron 150 mm long with both ends formed swallowtail for building into block work, etc.

Block work walling

Blocks for walling shall be properly bonded together and in such manner that no vertical joint in any one course shall be within 100 mm of a similar vertical joint in the courses immediately above or below.

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

The blocks shall be bedded and jointed in 1:3 cement/sand mortars with beds and joints not more than 20 mm or less than 12mm thick, all flushed up and grouted solid as the work proceeds. All walling shall be properly protected as the mortar is setting.

Ends of lintels, sills, joints, roof trusses, etc. shall be built in and bedded solid in mortar. They shall bear 300 mm on supports and shall be cast with a recessed throating under the front edge. Block walls shall be pinned up to the underside of concrete beams and slabs with cement.

Timber frames shall be built in with holdfasts and bedded solid and pointed both sides in cement mortar. Lugs of window frames shall be built in or cut and pinned to block work. Frames shall be bedded solid in mortar and pointed in approved mastic applied with a caulking gun externally.

All holes for pipes, electrical conduits, etc. mortises for bolts, dowels, etc. shall be cut or formed grouted up in cement and made good.

Horizontal reinforcement consisting of approved fabric shall be provided in every third course to span between the vertical block reinforcement. A proprietary wall reinforcement system may be used with the Engineer's approval.

At corners and junctions of walls, all horizontal reinforcement shall be lapped 300mm. The cavities of the blocks shall be filled with 1:3 cement/sand mortars around a mild steel reinforcing bar.

External faces of block work shall be rendered with 12 mm thick 1:5 cement/sand mortar to BS 5262 with a wood float finish.

Internal faces of block work shall be plastered to BS 5492 with an undercoat to suit the block work surface. The total thickness shall be 20 mm.

Openings through walls shall be formed to the net size required and rendered smooth in cement mortar. Where openings occur in cavity walls the wall shall be built solid all-round the opening.

Painting

Delivery and storage

All materials are to be delivered to the site in the manufacturers' original containers with seals unbroken and are to be clearly marked with the manufacturer's name or trade mark and a description of the contents, colour or pattern, and, if applicable, the conditions for storage and the date by which they shall be used.

All materials are to be stored at Site in accordance with the manufacturer's directions and to the satisfaction of the Engineer.

Materials samples and tests

During the course of the work, the Engineer may take samples of any of the paints, varnishes, stains or sealers, either from the sealed or open containers, before or during use.

When requested by the Engineer to do so, the Contractor shall submit samples for testing in accordance with BS 3900. The costs of such test, including transport and incidental costs, shall be borne by the Contractor if the results show non-compliance with the Specification.

Any work executed with materials tested and found not to comply with the requirements of the Specification shall be burnt off or otherwise removed and re-executed as directed by the Engineer.

Workmanship

Before painting, varnishing, staining or sealing is commenced; every possible precaution shall be taken to keep down dust.

During the execution of painting and decorating work, the Contractor shall take all necessary precautions to protect the health and safety of the workmen, including provision of washing facilities. The Contractor shall comply with all statutory rules and regulations affecting the trades engaged on the work.

Only skilled workmen shall be employed. A properly qualified foreman shall be constantly in attendance on the work while it is proceeding.

All brushes tools and containers used in carrying out the work shall be clean and free from foreign matter and shall be thoroughly cleaned before being used for a different type of material.

An ample supply of dustsheets shall be provided to protect the work as it proceeds.

Unless the manufacturers instruct otherwise, all liquid materials shall be thoroughly stirred before use. Where necessary the liquids shall be strained to remove any skin before application.

All containers shall be kept securely covered with tight fitting lids when not in use.

No dilution of liquid materials will be allowed, except as recommended by the manufacturer or as otherwise permitted by the Engineer.

The Contractor shall arrange his work so that any treated surfaces to be subsequently covered up shall be treated before they become inaccessible.

The painting work shall be carried out in accordance with BS 6150 and all painting varnishing, staining or sealing shall be executed in dry conditions when relative humidity is less than 80%. No such finishes shall be applied to surfaces structurally or superficially damp and all surfaces must be ascertained to be free from condensation, dust, oil or any other foreign matter before application of each coat.

The tints of undercoats are to approximate to those of the finishing colour but in order to indicate the number of coats applied, a difference is to be made in the shade of each succeeding coat.

Primed or undercoated work shall not be left in an exposed or otherwise unsuitable situation for too long a period before completing process.

Rubbing down before application of the final coats shall be by means of the wet process with waterproof glass paper. Preliminary coats of paint shall be lightly rubbed down with fine sandpaper before the next coat is applied.

Finishing coats shall be applied evenly over the whole surface to give a solid film free from brush marks, sags, runs, orange peeling or other defects.

The Contractor shall clean down all paintwork on completion, remove all marks due to spill and leave all painted surfaces to the complete satisfaction of the Engineer.

Samples of workmanship and colour

The Contractor shall prepare samples of the different finishes on the appropriate backing material, with the correct priming and undercoats where applicable, for acceptance by the Engineer, including alternatives as directed. These samples shall be prepared at least twenty-eight days before commencement of the actual work.

Preparation of surfaces

General

All surfaces shall be thoroughly prepared and shall be clean, free from loose dirt or other impurity. No paint shall be applied until all surfaces are thoroughly dry.

Preparation of the different materials to receive decorative and protective finishes shall be as specified below.

Concrete and concrete block work

Surfaces shall be brushed down thoroughly to remove all dust and loose material. Mortar droppings and nibs shall be removed and defects made good.

Efflorescence shall be brushed off as it appears and all decoration deferred until it ceases. lxxxviii. Plaster and rendering

Surfaces shall be brushed down to remove loose material and dust. The surface shall be washed, where directed, with a minimum of warm water and detergent, and allowed to dry.

Minor defects, cracks and holes, after cutting out as necessary, shall be made good and rubbed down flush with the surrounding surface.

Efflorescence shall be brushed off as it appears and all decoration deferred until it ceases. lxxxix. Hardwood

All surfaces shall be rubbed down smooth with fine abrasive, and dusted off. No further preparation is required for wood to be stained or clear sealed.

Iron and steelwork

Bare iron and steelwork to be painted shall be thoroughly prepared by removing all grease, dirt, rust and loose mill scale.

All tools shall be operated in such a manner that no sharp ridges or burrs are left and no cuts made in the steel.

Dust and other loose material shall be removed after cleaning. Oil and grease shall be removed with white spirit.

The priming coats shall be applied before any contamination or rusting occurs.

If the surfaces have been exposed to salt spray laden winds or to atmosphere polluted with chemicals, they shall be thoroughly washed with fresh water and allowed to dry before priming.

Steelwork delivered primed is to be thoroughly washed down to remove all dirt and grease. All defective paint, damaged, blistered, crazed or not firmly adhering, etc. shall be removed by scrapping back to a firm edge or, if necessary, the surface shall be completely stripped. All such areas shall be patch-primed immediately upon delivery. Areas damaged during erection shall be similarly dealt with.

Galvanized iron and steel

Galvanized iron and steel surfaces shall be thoroughly cleaned to remove all grease, dirt, dust etc.

Priming

General

Before priming, painting, varnishing, staining or sealing is started; all possible precautions shall be taken to keep down dust.

All metal fittings and fastenings shall be removed before the preparatory processes are started. They shall be cleaned and re-fixed in position on final completion of the work.

Special priming

Unless the paint manufacturer recommends otherwise the following materials shall receive special priming:

Cement based surfaces, such as concrete, fair face block work and brickwork, render and plaster, and asbestos free boards containing cement which are to receive oil based paints, shall be treated with an alkali-resistant primer.

Galvanized iron and steelwork shall be treated with calcium plumbate or a two-pack etching primer.

Copper shall be treated with a suitable etching primer.

Hardwood shall be treated with aluminum primer.

The smooth face of hardboard shall be treated with specially formulated hardboard primer.

All uncoated iron and steelwork cleaned of rust, mill scale, etc., in preparation for painting shall be primed within twenty-four hours of preparation whether at the works or on Site.

Painting

Concrete surfaces are to receive one coat of undercoat and two coats of approved plastic emulsion.

Iron and steelwork are to receive one coat of red lead primer, two coats of undercoat and one coat of high gloss finish.

All wooden surfaces are to be primed with aluminum wood primer and are to receive two coats of exterior grade undercoat and one coat of exterior or interior, as appropriate, high gloss finish.

Plumbing

Galvanized malleable iron brackets shall be used for fixing galvanized steel pipes up to 50 mm diameter. Pipes larger than 50 mm diameter shall be fixed with galvanized iron or brass hinged holder bats. For fixing to timber, stout galvanized pipe clips screwed to the timber shall be used.

Drainage pipes shall be encased with 150 mm surround of Class C20 concrete beneath floor slabs.

Workmanship in timber

All joiner's work shall be wrought and finished with a clean even and smooth surface, arises straight and cleanly cut, and all to be properly framed together, single or double mortised, and tanned, housed, dovetailed or fitted with all proper and suitable joints whether these are shown on the Drawings or not, and all joints shall be fitted without stopping, the whole being glued, feathered, tongued and fixed with screws, nails etc. all detailed on the Drawings or as approved by the Engineer and in accordance with the best class of workmanship.

Adhesives used for timberwork shall be synthetic resins of the phenol and ameen plastic type BR in accordance with BS 1204 Parts 1 and 2.

Nails for joinery shall be oval lost head nails.

Screws shall be countersunk wood screws. Steel screws shall be used only in concealed positions, or where the work is to be painted, elsewhere brass shall be used. Steel screws in contact with aluminum shall be dipped in zinc chromate solution before fixing. Ironmongery is to be fixed with screws of the same metal, except for aluminum, which shall be fixed with chromium, plated brass screws.

All joinery shall be properly protected from injury or from weather by casing wherever required.

Wooden doors

General

The materials used in the construction of wooden doors shall be in accordance with BS 459. Doors shall be obtained from an approved manufacturer and the details and methods of construction shall be to the Engineer's approval.

. Flush doors

Flush doors shall be 45 mm thick overall, faced both sides with 4mm plywood and lipped on all edges with 10 mm thick hardwood. External doors shall be faced both sides with exterior quality plywood and assembled with waterproof adhesive to type MR of BS 1203. Suitable blocking pieces for door furniture shall be built in. Glazed

vision panels shall be inserted as shown on the Drawings and shall be to the approval of the Engineer.

Cupboard doors shall be as above but 40mm thick overall.

Door and window furniture

Each door shall be provided complete with all hinges, handles, locks, three keys per lock, bolts, doorstops etc. and all necessary screws, bolts and other fixings. Double leaf doors shall be provided with barrel bolts top and bottom of the first closing leaf, complete with flush mounted floor socket, and handle for the top bolt extended to 2.0 m above floor level.

Windows shall be provided with all necessary hinges, fasteners, locks, catches, stays, etc.

Glazing

Glazing shall be clear or obscured glass set in metallic putty and shall be subject to the approval of the Engineer. Clear glass shall be used for all windows except in toilets or as otherwise directed by the Engineer. Glazing shall be carried out in accordance with BSCP 152 "Glazing and fixing of glass in buildings", and the window manufacturer's instructions.

Proprietary sheet metal roofing

The fixing of all proprietary roof sheeting, etc. shall be in accordance with the manufacturer's details and as shown on the Drawings.

Bituminous felt roofing

Bituminous roofing felt shall be laid in accordance with BSCP 144 Part 3. Before laying roofing felt the underlying concrete surface shall have any cracks and expansion joints sealed with a bituminous patching compound. A slip membrane comprising one layer of one ply roofing felt shall be laid and adhered to the concrete at all edges.

Two under layers of two ply roofing felt shall be applied with 100 mm overlaps between strips, bonded with bitumastic compound at all edges. The overlap joints between successive layers shall be staggered to half the strip width.

A surface layer of grey mineralized surface felt of an approved colour shall be laid with 100 mm overlaps, fully bonded with hot applied bitumen compound.

Guttering

Gutters shall be laid to falls as directed. The general arrangement of the drainage system shall be to the Engineer's approval.

Fencing and gates

Wire and metal posts used in compound boundary fences and gates shall be of galvanized steel to the details shown on the Drawings.

Posts, stays and gates shall be primed with one coat of zinc chromate paint and finished with two coats of oil based aluminum paint.

The whole of the fencing shall be to a pattern approved by the Engineer.

Ladders

Unless otherwise indicated permanent ladders shall be of mild steel and shall be in accordance with BS 4211. Rungs shall be 20mm diameter solid round bar and shall be at 300 mm centres. Stringers shall be 65 mm x 10 mm strip set 300 mm apart shall extend 1.0 m above the top rung and shall be turned out at the bottom and drilled for 12 mm holding down bolts. Intermediate and top support stays shall be 100 mm x 100 mm strip, bolted to the stringers with 12 mm bolts and shall be of a length that will give a minimum clearance of 200 mm behind the rungs. Support stays shall have a maximum spacing of 2.5 m.

Ladders exceeding 4.0 m height shall be equipped with a safety cage consisting of hoops of 50 mm x 8 mm strip bent to a diameter of 0.76 m, fixed to the stringers at 0.55 m centres and joined by one additional stringer of 50 mm x 8 mm strip at the maximum distance from the rungs.

All components of ladders shall be galvanized after cutting, drilling and welding and all fixing bolts, nuts washers, etc, necessary to complete the installation shall be provided.

Ladders to insides of water retaining structures shall be galvanized mild steel.

Open mesh steel flooring

Open mesh flooring shall be to BS 4592 and shall be painted black in accordance with the Specification.

Kicker plates 100 mm high shall be provided round all openings.

Chequer plate flooring

Chequer plate flooring shall be of mild steel and manufactured with diamond chequering or other non-slip pattern. The plates shall be of sufficient thickness not to bend or spring in ordinary usage and shall be fitted evenly and truly into steel angle frames or curbing with suitable attachments for building into concrete flooring.

The plates and frames shall be painted an approved colour in accordance with the Specification.

Hand railing

Hand railing shall consist of 38 mm diameter galvanized steel sections of tubing BS 1387, screwed at each end. The sections shall be joined by 38 mm diameter galvanized steel equal crosses; equal tees or short radius 90o bends where appropriate, such that the top rail shall be 1 m and the lower rail 0.5 m above the concrete slab, and the spacing between standards shall be 2 m maximum. A 38 mm diameter galvanized steel flange shall be screwed to the base of each standard and drilled for four 20 mm diameter, 100 mm long mild steel rag bolts which shall be cast into the reinforced concrete slab.

All hand railing components shall be galvanized after cutting, screwing and drilling and shall be supplied complete with all bolts, nuts, washers and other fixings necessary to complete the installation.

Removal of anthills

Anthills that come within the area covered by the building and three metres clear all round shall be entirely removed and the queen eradicated. The cavity formed by the removal of the nest must be treated and filled in with approved materials in layers not exceeding 300 mm thick well rammed and consolidated.

Ant proofing

No ant treatment is to be carried out near potable water structures. Otherwise ant treatment is to mean the treatment of the whole of the surface under floors with a solution composed of 5 parts by weight of Pentachlorophenol to 95 parts by weight of furnace oil well mixed together.

The solution is to be applied by means of a watering can with a fishtail spout. It is to be accurately applied at the rate of five liters per square meter of surface.

Before and after the application the surface is to be cleaned free from foreign matter, particularly scrap timber and cellulose material.

Fencing

Details of the types of fencing and gates to be installed under the Contract are included with the Drawings. The Contractor shall, when required provided details of any alternative type of fencing. The Contractor should note that the Engineer is not obliged to accept the Contractor's alternative proposals, but will not unreasonably withhold consent, provided the Contractor's alternative design is fit for the purpose intended, is demonstrably durable and meets all other requirements of the relevant British Standard.

- Fencing shall be strained wire mesh fencing also to BS 1722 except as indicated.
- All bolts to fencing shall be burned over.
- All posts to be founded in Class E concrete.
- All steelwork to fencing shall be galvanized and painted in accordance with the relevant painting specification.

Hand railing

General details of the type of hand railing to be installed under the Contract are included in the Tender Drawings. The Contractor shall, when required, submitted for consideration alternative type of hand railing proposed. The Contractor should note that the Engineer is not obliged to accept the Contractor's alternative proposals, but will not unreasonable withhold consent, provided the Contractor's alternative design is fit for the purpose intended and is demonstrably durable.

Landscaping and miscellaneous works

Stone Pitching

Stone pitching shall be either set in mortar or set dry. Stones shall be sound, tough and durable. No stone shall be less than 200 mm minimum dimension, except that smaller pieces may be used for filling spaces between the larger stones.

Mortar shall be composed of 1 part cement to 4 parts of sand of approved quality.

All pitching shall be set on a backing of free-draining material. No pitching shall be placed until the underlying material has been compacted sufficiently to avoid future settlement. Unless otherwise specified, pitching on embankments shall be supported on a toe wall of stone masonry, approximately 1,000 mm deep x 350 thick unless otherwise instructed.

Commencing at the toe wall, if any, the stone pitching shall be firmly bedded into the underlying material and against the adjoining stones. The stones shall be set by hand with the longest dimension at right angles to the slope, with their surfaces in close contact, and in courses so as to break joint. The spaces between the larger stones shall be filled with spalls securely rammed into place. The finished surface of the pitching shall present an even, tight surface.

Where pitching set in mortar is specified, suitable weep holes shall be formed. Remaining spaces between the stones shall be filled with mortar in such a way as to completely fill the voids. The joints shall be neatly pointed. Pitching set in mortar shall be cured for a minimum period of 4 days by continuous spraying, or by covering with water-retaining material and keeping wet.

Precast paving

Precast paving slabs shall be in Grade 25/10 concrete with a wood float finish and shall be 50 mm thick unless otherwise shown on the Drawings.

Where slabs are to be laid on original ground, topsoil shall be removed and the subsoil shall be scarified to a depth of 150 mm and compacted to 93% of modified AASHTO density. The Contractor shall remove to a level agreed with the Engineer any locally soft areas where the above compaction cannot be achieved. The excavated material shall be replaced with approved backfill compacted to the above density.

Where slabs are to be laid on sand, the area to be paved shall be trimmed to falls, compacted and overlain with 50 mm of sand which shall be watered and raked to a true surface. The paving slabs shall then be laid and bedded down using a light vibrating-

plate compacter. Concrete edge strips shall be provided on the perimeters of such paved areas to prevent loss of sand.

Where slabs are to be laid on concrete bedding, the area to be paved shall be trimmed to falls, compacted and overlain with 75 mm of Class E dry mix concrete. The dry mix concrete shall be spread out dry and raked to a true surface. The paving slabs shall then be laid and bedded down using a light vibrating-plate compacter. Joints between slabs shall be filled and pointed with 1:4 cement: sand mortar.

Topsoil and grassing

The Contractor will be required to complete all surface drainage works and other remedial works indicated by the Engineer ahead of top soiling and grassing.

Topsoil stockpiled from the Works shall be spread to a minimum depth of 100 mm over the areas to be grassed.

All surfaces to be grassed shall immediately before planting of grass be reduced to a fine tilt free from stones larger than 50 mm.

An approved indigenous star type grass (e.g. *Cynodon dactylon*, *Cynodon niemfuensis* (Star grass) and *Chloris gayana* (Rhodes grass) shall be used for all planting except where the Engineer indicates otherwise. All grass shall be won from areas designated for such use by the Contractor. The Contractor shall ensure that such areas are not made barren by the excessive transplanting of grass runners from such areas. In general the cover of areas used for winning grass runners shall not be reduced by more than 50%. Where, in the opinion of the Engineer, the removal of grass is considered excessive, he will instruct the Contractor accordingly.

Splits (clumps) of the transplanted star grass shall be planted at a grid not exceeding 300 mm in all areas where such grass is required. Where instructed by the Engineer, the Contractor will be required to apply an approved fertilizer to the grassed areas.

Planting shall preferably be carried out at the beginning of a rainy season and the Contractor will be required to adjust his works program accordingly. In exceptional circumstances, grassing works will be allowed during the Defects Liability Period for the Works, but the Contractor should expect consequent extended Defects Liability Periods for these areas of the Works.

The Contractor shall care for and water the grass at his own expense until it is firmly established both during the construction and Defects Liability Periods for the Works.

Allowance for the following operations considered necessary for the establishment of grassed areas should be made in tender pricing:-

Planting

The Contractor shall obtain and plant suitable shrubs and trees as directed and shall provide the same maintenance input during the construction and Defects Liability Period as that provided for grassed areas.

In the case of ground cover plants, the lateral shoots shall be spread out well around the plant as far as shape permits to encourage outward growth.

Climbing plants shall be positioned with the root ball touching the wall/fence, and shoots angled towards the structure to be climbed. Where appropriate, climbing stems shall be lightly trained to climbing frames. All containers, labels, canes and ties shall be removed unless otherwise instructed.

Failure of shrubs and trees due to drought will be the sole responsibility of the Contractor

Access Roads

Where the Contractor proposes to use a private road as an access road to the Works or to a quarry or a borrow pit, it shall be entirely his responsibility to comply with any conditions laid down by the owner, and the Employer will be in no way responsible for any claim arising from such arrangements.

SECTION VI - DRAWINGS

List of Drawings

Drawing No.	Description
1	Floor Plans, Roof Sections and Elevations
2	Floor Plans, Roof Sections and Elevations
3	Floor Plans, Roof Sections and Elevations
4	Roof Layout and Details
5	Gate Details
6	Fence Details

NB:

The actual drawings including Site plans have been provide in a separately in the attachments.

SECTION VII - BILL OF QUANTITIES

BILL 1: FENCING					
Item	Description	Unit	Qty	Rate	Amount (Kshs.)
1.1	Supply and install 2.4M high by 14 guage chain link complete with 12.5 guage X 6 strand galvanised barbed wire fencing with cranked precast concrete posts at 3m centers in mass concrete sorround as per drawing	M	250		
1.2	Supply and install complete pre painted steel gate as shown on drawings	No.	1		
1.3	Provide a provisional for Mobilization, perfomance bond, insurance and statutory fees	Sum	1		
TOTAL CARRIED TO SUMMARY PAGE					

BILL 2: Basic Hall					
Item	Description	Unit	Qty	Rate	Amount Ksh.
2.1	Foundation				
2.1.1	Site clearance. Clear all vegetation, tree stumps etc in readiness for construction	M ²	120		
2.1.2	Top soil stripping strip all soil up to 300mm deep	M ²	80		
2.1.3	Excavation Excavate soil other than top soil to firm ground to the satisfation of the Engineer	M ³	80		
2.1.4	Strip footing				

2.1.4.1	provide and place 50 mm 1:3:6 blinding concrete	M ²	21.6		
2.1.4.2	Provide and place class 20 concrete for strip footing	M ³	13		
2.1.4.3	Provide and fix in place mild reinforcement steel (Dia 12mm Deformed)	Kg	128.16		
2.1.4.4	Provide and fix in place mild reinforcement steel (Dia 8mm for links) at 300 mm centers	Kg	85.32		
2.1.4.5	Provide and fix 300mm wide formwork to the sides of strip foundation	M	72		
2.1.5	Foundation walling				
2.1.5.2	Provide and place 225mm wide foundation walling in 1:3 motar.	M ²	36		
2.1.5.3	Provide place and compact 250mm hardcore	M ³	80		
2.1.5.4	provide and place 50mm quarry dust on top of hardcore	M ²	80		
2.1.5.5	Provide and place anti termite treatment.	M ²	80		
2.2	Floor				
2.2.1	Provide and fix in place 1000 guage polythene sheet damp proofing	M ²	80		
2.2.2	Provide and fix in place A142 B.R.C mesh reinforcement	M ²	80		
2.2.3	Provide mix place and cure class 20 concrete for floor,	M ³	8		
2.2.4	Provide and fix formwork to side of floor slab 100mm in width	M	36		
2.2.5	Steel trowel finish to the top of floor	M ²	80		

2.2.6	Provide for fixing of steel bolts and cap in order to receive steel columns as shown on drawings	Lot	1		
2.3	superstructure				
2.3.1	walling in 150 mm Natural stone and 1:3 Motar as in drawings	M ²	102		
2.3.2	Apply 1:3 25mm motar for plaster on the inner wall, top of wall and beams	M ²	102		
2.3.3	Finish the outside wall with pointiny (KEY)	M ²	102		
2.3.4	Apply 3 coats (1 plastic emulsion and 2 su[er gross to interior walls)	M ²	102		
2.3.5	Apply silicone emulsion exterior paint to exterior plastered surfaces	M ²	5		
2.3.6	provide all materials and fix wiremesh on the sides of building qs shown on drawings held in place by 25mmX25mm angle irons at 1m intervals	M ²	24		
2.3.7	On bolts and base plate on the floor provide and fix 100X100X4 SHS as shown on drawings	M	24		
2.3.8	prove and fix 100X100X4 SHS for wall plate as shown on drawings	M	20		
2.3.9	Provide all materials and weld in place 40X40X3mm SHS so as to form truss as shown on drawings	M	60		
2.3.10	hoist and fix in place trusses as shown on drawings	No.	4		
2.3.11	provide and fix 100*50*3 SHS @600mm centers for purlins	M	176		

2.3.12	Using rubber and steel washer and bolts and nuts provide all materials and fix prepaited 28 guage box profile G.I roofing	M ²	280		
2.3.13	provide and fix 1200 X2200mm double Leaf steel doors complete with locks	No,	3		
TOTAL CARRIED TO SUMMARY PAGE					

ADAPTATION VILLAGE BILL OF QUANTITIES	
SUMMARY PAGE	
BILL 1: Fence	
BILL 2: Basic Hall	
Total	
10% Contigencies	
Grand Total	
TOTAL FOR 20 SITES	

SECTION VIII – STANDARD FORMS

- (i) Form of Invitation for Tenders
- (ii) Form of Tender
- (iii) Letter of Acceptance
- (iv) Form of Agreement
- (v) Form of Tender Security
- (vi) Performance Bank Guarantee
- (vii) Bank Guarantee for Advance Payment
- (viii) Qualification Information
- (ix) Tender Questionnaire
- (xi) Confidential Business Questionnaire
- (x) Statement of Foreign Currency Requirement
- (xi) Details of Sub-Contractors
- (x) Request for Review Form

FORM OF INVITATION FOR TENDERS

_____ [date]

To: _____ [name of Contractor]
_____ [address]

Dear Sirs:

Reference: _____ [Contract Name]

You have been prequalified to tender for the above project.

We hereby invite you and other prequalified tenderers to submit a tender for the execution and completion of the above Contract.

A complete set of tender documents may be purchased by you from _____

_____ [mailing address, cable/telex/facsimile numbers].

Upon payment of a non-refundable fee of Kshs _____

All tenders must be accompanied by _____ number of copies of the same and a security in the form and amount specified in the tendering documents, and must be delivered to

_____ [address and location]

at or before _____ (time and date). Tenders will be opened immediately thereafter, in the presence of tenderers' representatives who choose to attend.

Please confirm receipt of this letter immediately in writing by cable/facsimile or telex.

Yours faithfully,

_____ Authorised Signature

_____ Name and Title

FORM OF TENDER

TO: _____ [Name of Employer] _____ [Date]
_____ [Name of Contract]

Dear Sir,

1. In accordance with the Conditions of Contract, Specifications, Drawings and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete such Works and remedy any defects therein for the sum of Kshs. _____ [Amount in figures] Kenya Shillings _____ [Amount in words]
2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Project Manager's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Appendix to Conditions of Contract.
3. We agree to abide by this tender until _____ [Insert date], and it shall remain binding upon us and may be accepted at any time before that date.
4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute a binding Contract between us.
5. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this _____ day of _____ 20 _____

Signature _____ in the capacity of _____

duly authorized to sign tenders for and on behalf of
_____ [Name of Employer]
of _____ [Address of Employer]

Witness; Name _____

Address _____

Signature _____

Date _____

LETTER OF ACCEPTANCE
[letterhead paper of the Employer]

_____ [date]

To: _____
[name of the Contractor]

[address of the Contractor]

Dear Sir,

This is to notify you that your Tender dated _____
for the execution of _____
[name of the Contract and identification number, as given in the Tender documents] for the
Contract Price of Kshs. _____ *[amount in figures]* [Kenya
Shillings _____ *(amount in words)*] in accordance with the
Instructions to Tenderers is hereby accepted.

You are hereby instructed to proceed with the execution of the said Works in
accordance with the Contract documents.

Authorized Signature

Name and Title of Signatory

Attachment : Agreement

FORM OF AGREEMENT

THIS AGREEMENT, made the _____ day of _____ 20 _____
between _____ of [or whose registered
office is situated at] _____
(hereinafter called "the Employer") of the one part AND
_____ of [or whose registered
office is situated at] _____
(hereinafter called "the Contractor") of the other part.

WHEREAS THE Employer is desirous that the Contractor executes

_____ *(name and identification number of Contract)* (hereinafter called "the Works") located
at _____ *[Place/location of the Works]* and the Employer has
accepted the tender submitted by the Contractor for the execution and completion of
such Works and the remedying of any defects therein for the Contract Price of
Kshs _____ *[Amount in figures]*, Kenya
Shillings _____ *[Amount in words]*.

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and shall be read and construed as part of this Agreement i.e.
 - (i) Letter of Acceptance
 - (ii) Form of Tender
 - (iii) Conditions of Contract Part I
 - (iv) Conditions of Contract Part II and Appendix to Conditions of Contract
 - (v) Specifications
 - (vi) Drawings
 - (vii) Priced Bills of Quantities
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any 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.

IN WITNESS whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The common Seal of _____

Was hereunto affixed in the presence of _____

Signed Sealed, and Delivered by the said _____

Binding Signature of Employer _____

Binding Signature of Contractor _____

In the presence of (i) Name _____

Address _____

Signature _____

[ii] Name _____

Address _____

Signature _____

FORM OF TENDER SECURITY

WHEREAS(hereinafter called "the Tenderer") has submitted his tender dated for the construction of
..... (name of Contract)

KNOW ALL PEOPLE by these presents that WE having our registered office at(hereinafter called "the Bank"), are bound unto(hereinafter called "the Employer") in the sum of Kshs..... for which payment well and truly to be made to the said Employer, the Bank binds itself, its successors and assigns by these presents sealed with the Common Seal of the said Bank this Day of20.....

THE CONDITIONS of this obligation are:

- 1. If after tender opening the tenderer withdraws his tender during the period of tender validity specified in the instructions to tenderers
Or
- 2. If the tenderer, having been notified of the acceptance of his tender by the Employer during the period of tender validity:
 - (a) fails or refuses to execute the form of Agreement in accordance with the Instructions to Tenderers, if required; or
 - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Tenderers;

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including thirty (30) days after the period of tender validity, and any demand in respect thereof should reach the Bank not later than the said date.

[date]

[signature of the Bank]

[witness]

[seal]

PERFORMANCE BANK GUARANTEE

To: _____(Name of Employer) _____(Date)
_____ (Address of Employer)

Dear Sir,

WHEREAS _____(hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ (hereinafter called "the Works");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognised bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Kshs. _____ (amount of Guarantee in figures) Kenya Shillings _____ (amount of Guarantee in words), and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Kenya Shillings _____ (amount of Guarantee in words) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion.

SIGNATURE AND SEAL OF THE GUARANTOR _____

Name of Bank _____

Address _____

Date _____

BANK GUARANTEE FOR ADVANCE PAYMENT

To: _____ [name of Employer] _____ (Date)
_____ [address of Employer]

Gentlemen,

Ref: _____ [name of Contract]

In accordance with the provisions of the Conditions of Contract of the above-mentioned Contract, We, _____ [name and Address of Contractor] (hereinafter called "the Contractor") shall deposit with _____ [name of Employer] a bank guarantee to guarantee his proper and faithful performance under the said Contract in an amount of Kshs. _____ [amount of Guarantee in figures] Kenya Shillings _____ [amount of Guarantee in words].

We, _____ [bank or financial institution], as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____ [name of Employer] on his first demand without whatsoever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding Kshs _____ [amount of Guarantee in figures] Kenya Shillings _____ [amount of Guarantee in words], such amount to be reduced periodically by the amounts recovered by you from the proceeds of the Contract.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between _____ [name of Employer] and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

No drawing may be made by you under this guarantee until we have received notice in writing from you that an advance payment of the amount listed above has been paid to the Contractor pursuant to the Contract.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____ (name of Employer) receives full payment of the same amount from the Contract.

Yours faithfully,

Signature and Seal _____

Name of the Bank or financial institution _____

Address _____

Date _____

Witness: Name: _____

Address: _____

Signature: _____

Date: _____

QUALIFICATION INFORMATION

1. Individual Tenderers or Individual Members of Joint Ventures

1.1 Constitution or legal status of tenderer (attach copy or Incorporation Certificate);

Place of registration: _____

Principal place of business _____

Power of attorney of signatory of tender _____

1.2 Total annual volume of construction work performed in the last five years

Year	Volume	
	Currency	Value

1.3 Work performed as Main Contractor on works of a similar nature and volume over the last five years. Also list details of work under way or committed, including expected completion date.

Project name	Name of client and contact person	Type of work performed and year of completion	Value of Contract
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

1.4 Major items of Contractor's Equipment proposed for carrying out the Works. List all information requested below.

Item of Equipment	Description, Make and age (years)	Condition(new, good, poor) and number available	Owned, leased (from whom?), or to be purchased (from whom?)
_____	_____	_____	_____
_____ (et c.)	_____	_____	_____

- 1.5 Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data.

Position	Name	Years of experience (general)	Years of experience in proposed position
Project Manager			
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
(etc.)			

- 1.6 Financial reports for the last five years: balance sheets, profit and loss statements, auditor's reports, etc. List below and attach copies.

- 1.7 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List below and attach copies of supportive documents.

- 1.8 Name, address and telephone, telex and facsimile numbers of banks that may provide reference if contacted by the Employer.

- 1.9 Statement of compliance with the requirements of Clause 1.2 of the Instructions to Tenderers.

- 1.10 Proposed program (work method and schedule) for the whole of the Works.

2 Joint Ventures

- 2.4 The information listed in 1.1 – 1.10 above shall be provided for each partner of the joint venture.

- 2.5 The information required in 1.11 above shall be provided for the joint venture.
- 2.6 Attach the power of attorney of the signatory(ies) of the tender authorizing signature of the tender on behalf of the joint venture
- 2.7 Attach the Agreement among all partners of the joint venture (and which is legally binding on all partners), which shows that:
- a) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
 - b) one of the partners will be nominated as being in charge, authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture; and
 - c) the execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.

TENDER QUESTIONNAIRE

Please fill in block letters.

1. Full names of tenderer

.....

2. Full address of tenderer to which tender correspondence is to be sent (unless an agent has been appointed below)

.....

3. Telephone number (s) of tenderer

.....

4. Telex address of tenderer

.....

5. Name of tenderer's representative to be contacted on matters of the tender during the tender period

.....

6. Details of tenderer's nominated agent (if any) to receive tender notices. This is essential if the tenderer does not have his registered address in Kenya (name, address, telephone, telex)

.....

.....

Signature of Tenderer

Make copy and deliver to: _____ (*Name of Employer*)

CONFIDENTIAL BUSINESS QUESTIONNAIRE

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2 (b) or 2 (c) and 2 (d) whichever applies to your type of business.

You are advised that it is a serious offence to give false information on this Form.

Part 1 – General

Business Name

Location of business premises; Country/Town.....

Plot No..... Street/Road

Postal Address..... Tel No.....

Nature of Business.....

Current Trade Licence No..... Expiring date.....

Maximum value of business which you can handle at any time: K.
pound.....

Name of your bankers.....

Branch.....

Part 2 (a) – Sole Proprietor

Your name in full..... Age.....

Nationality..... Country of Origin.....

*Citizenship details

Part 2 (b) – Partnership

Give details of partners as follows:

	<i>Name in full</i>	<i>Nationality</i>	<i>Citizenship Details</i>	<i>Shares</i>
1.
2.
3.

Part 2(c) – Registered Company:

Private or public.....

State the nominal and issued capital of the Company-

Nominal Kshs.....

Issued Kshs.....

Give details of all directors as follows:

Name in full . Nationality. Citizenship Details*. Shares.

1.

.....

2.

.....

3.

.....

4.

.....

Part 2(d) – Interest in the Firm:

Is there any person / persons in(Name of Employer) who has interest in this firm? Yes/No.....(Delete as necessary)

I certify that the information given above is correct.

.....
(Title)

.....
(Signature)

.....
(Date)

- Attach proof of citizenship

STATEMENT OF FOREIGN CURRENCY REQUIREMENTS

(See Clause 23] of the Conditions of Contract)

In the event of our Tender for the execution of _____
_____ (name of Contract) being accepted, we would
require in accordance with Clause 21 of the Conditions of Contract, which is
attached hereto, the following percentage:

(Figures)..... (Words).....

of the Contract Sum, (Less Fluctuations) to be paid in foreign currency.

Currency in which foreign exchange element is required:

.....

Date: The Day of 20.....

Enter 0% (zero percent) if no payment will be made in foreign currency.

Maximum foreign currency requirement shall be _____ (percent) of the
Contract Sum, less Fluctuations.

(Signature of Tenderer)

DETAILS OF SUB-CONTRACTORS

If the Tenderer wishes to sublet any portions of the Works under any heading, he must give below details of the sub-contractors he intends to employ for each portion.

Failure to comply with this requirement may invalidate the tender.

(1) Portion of Works to be sublet:

[i] Full name of Sub-contractor
and address of head office:

.....

(ii) Sub-contractor's experience
of similar works carried out
in the last 3 years with
Contract value:

.....

.....

(2) Portion of Works to sublet:

(i) Full name of sub-contractor
and address of head office:

.....

.....

(ii) Sub-contractor's experience
of similar works carried out
in the last 3 years with
contract value:

.....

[Signature of Tenderer)

Date

LETTER OF NOTIFICATION OF AWARD

Address of Procuring Entity

To: _____

RE: Tender No. _____

Tender Name _____

This is to notify that the contract/s stated below under the above mentioned tender have been awarded to you.

1. Please acknowledge receipt of this letter of notification signifying your acceptance.
2. The contract/contracts shall be signed by the parties within 30 days of the date of this letter but not earlier than 14 days from the date of the letter.
3. You may contact the officer(s) whose particulars appear below on the subject matter of this letter of notification of award.

(FULL PARTICULARS) _____

SIGNED FOR ACCOUNTING OFFICER

REPUBLIC OF KENYA

PUBLIC PROCUREMENT ADMINISTRATIVE REVIEW BOARD

APPLICATION NO.....OF.....20.....

BETWEEN

.....APPLICANT

AND

.....RESPONDENT (*Procuring Entity*)

Request for review of the decision of the..... (*Name of the Procuring Entity*) of
.....dated the...day of20.....in the matter of Tender No.....of
.....20...

REQUEST FOR REVIEW

I/We.....,the above named Applicant(s), of address: Physical
address.....Fax No.....Tel. No.....Email, hereby request the Public
Procurement Administrative Review Board to review the whole/part of the above
mentioned decision on the following grounds , namely:-

- 1.
- 2.
- etc.

By this memorandum, the Applicant requests the Board for an order/orders that: -

- 1.
- 2.
- etc

SIGNED(Applicant)

Dated on.....day of/...20...

FOR OFFICIAL USE ONLY

Lodged with the Secretary Public Procurement Administrative Review Board on
..... day of20.....

SIGNED
Board Secretary