Kirinyaga University

Tel: +254 701562092, +254 728499650, +254 709742000/30
P.O. Box 143-10300 Kerugoya.

Email: info@kyu.ac.ke
Website: www.kyu.ac.ke

TENDER FOR THE PROPOSED FOOTBRIDGE AT KIRINYAGA UNIVERSITY

(OPEN TENDER)

TENDER NO: KyU/TN/F/001/2020-2021

TENDER CLOSING DATE: **FRIDAY 20TH NOVEMBER 2020**

TENDER CLOSING AND OPENING TIME: **10.00 A.M.**

ISSUED BY:
THE VICE CHANCELLOR
KIRINYAGA UNIVERSITY
P.O.BOX 143-10300
KERUGOYA, KENYA

SIGNATURE PAGE AND NOTES

KIRINYAGA UNIVERSITY

TENDER FOR THE PROPOSED FOOTBRIDGE AT KIRINYAGA UNIVERSITY

Supplied as part of the Contract No. **KyU/TN/F/001/2020-2021**

Issued by: -
VICE CHACELLOR
Kirinyaga University
P.O.BOX 143-10300
KERUGOYA, KENYA

The contract for the above mentioned works entered into this…… day of……2020 by the undersigned refers to these Tender Documents and the General Specification shall be read and construed as part of the said contract

…….. …….

THE CONTRACTOR **VICE CHANCELLOR**
KIRINYAGA UNIVERSITY

Date…… **Date……**

SPECIAL NOTES

The contractor is required to check the number of pages of the tender Documents and should he find any missing or in duplicate or figures indistinct he must inform the VICE CHANCELLOR Kirinyaga University at once and have the same rectified**.**

Should the contractor be in doubt about the precise meaning of any item or figure for any reason whatsoever, he must inform VICE CHANCELLOR, KIRINYAGA UNIVERSITY in order that the correct meaning may be decided before the date of submission of tenders.

No liability will be admitted nor claim allowed in respect of errors in the contractor's Tender due to mistakes in the specifications, which should have been rectified in the manner, described above.

KIRINYAGA UNIVERSITY

STANDARD TENDER DOCUMENT

FOR

THE PROPOSED FOOTBRIDGE

AT

KIRINYAGA UNIVERSITY

OCTOBER 2020

TABLE OF CONTENTS

SECTION I

INVITATION FOR TENDERS

Tender reference No. **KyU/TN/F/001/2020-2021**

Tender Name: **TENDER FOR THE PROPOSED FOOTBRIDGE AT KIRINYAGA UNIVERSITY**

1.1 **Kirinyaga University** invites sealed tenders for the proposed FOOTBRIDGE AT KIRINYAGA UNIVERSITY

1.2 Interested eligible candidates may obtain further information and inspect tender documents at **(Kirinyaga University, P.O. Box 143-10300 Kerugoya, Along Kutus Kerugoya Junction, Procurement Office** during normal working hours.

1.3 A complete set of tender documents may be obtained by interested candidates upon payment of a non-refundable fees of Ksh. 1000 in cash or Bankers Cheque payable to Kirinyaga University

1.4 Prices quoted should be net inclusive of all taxes, must be in Kenya shillings and shall remain valid for (150) 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 Kirinyaga University, administration block addressed to The Vice Chancellor, Kirinyaga University P.O. Box 143-10300 Kerugoya so as to be received on or before **FRIDAY 20TH NOVEMBER 2020** at 10.00 a.m.).

1.6 Tenders will be opened immediately thereafter in the presence of the candidates or their representatives who choose to attend at Kirinyaga University board room. **LATE BIDS WILL NOT BE ACCEPTED**

Vice Chancellor,
Kirinyaga University
P.O. Box 143-10300
Kerugoya

SECTION II

INSTRUCTIONS TO TENDERERS

TABLE OF CONTENTS

INSTRUCTIONS TO TENDERERS.

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

1.1 Kirinyaga University 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 prequalification 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, authorized 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; (**DETAILED EVALUATION CRITERIA PROVIDED)**

(a) annual volume of construction work of at least 2.5 times the estimated annual cash flow for the Contract;

(b) experience as main contractor in the construction of at least the last five years

(c) works of similar nature and complexity equivalent to the Works over the last 5 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 changed for the tender document shall not exceed Kshs. 1,000/=

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
(i) Confidential business questionnaire

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.

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 of not less than 2% of the quoted tender sum;

(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 (150) 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 authorized 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 initialed 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 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 Kirinyaga University 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.

NB: DETAILED EVALUATION CRITERIA IS PROVIDED IN SEC 8: APPENDIX TO INSTRUCTIONS TO TENDERERS

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

8. APPENDIX TO INSTRUCTION TO TENDERERS

8.1 DETAILED EVALUATION CRITERIA FOR BIDDERS

Evaluation of tenders shall be carried out in four stages as follows

8.1.1 Preliminary examination to determine responsiveness of tenders
8.1.2 Mandatory documents
8.1.3 Technical evaluation
8.1.4 Financial evaluation
8.1.5 Due Diligence Exercise

8.1.1 Preliminary examination to determine responsiveness of tenders

The evaluation committee shall determine preliminary responsiveness of bids as detailed in the instructions to tenderer.

Bidders shall be deemed as non-responsive or responsive depending on the following;

S/No.	Particulars	Provided/ Not provided
1.	Tender Security of not less than 2% of the tender sum valid for 120 days from the date of tender opening. The tender security can be from a bank or insurance company.	
2.	Tender document Must be sequentially serialized (paginated) on every page.	
3.	Tender documents MUST be bound. No loose documents will be accepted.	
4.	Bidders should return two copies of the tender documents 'Original" and "Copy"	

Any bidder found to be non-responsive shall not be evaluated further.

8.1.2 Mandatory documents

These are mandatory requirements and bidders are expected to attach all the documents in order to proceed to the next stage of evaluation. This stage shall be evaluated on a YES/NO basis.

Note: All required certified copies of documents should be certified by the issuing office or an advocate/magistrate registered in Kenya.

At this stage, bidders are supposed to submit the following mandatory legal requirements;

S/No.	Particulars	YES/No
1.	Form of Tender (duly filled, signed and stamped by the tenderer)	
2.	Valid Tax Compliance Certificate for the company/ business from KRA valid as at the date of tender opening (the TCC Will be verified online through KRA's TCC Checker)	
3.	A certified copy of Current Trading License/Business Permit for the year 2020	
4.	A certified Copy of Certificate of registration/Incorporation and/or change of name for the company/ business.	
5.	A certified copy of company form CR12 showing directors and shareholders of the company as registered by the registrar of companies.	
6.	Confidential Business Questionnaire Form (duly filled, signed and stamped)	
7.	Certified copies of company audited financial statements/ accounts for the last 2 years (2018, 2019).	
8.	Company VAT Certificate	
9.	Power of Attorney document for the person authorized to sign the tender documents	
10.	Provide certified copies of reference letters from previous clients where similar or related works have been carried out (Minimum 5 letters)	
11.	A signed letter indicating the bidder delivery schedule for the project.	
12.	Details of bidders' litigation history, including any PPRAB history by or against the bidder and the decisions made on the same. In case the bidder does not have any litigation history they should write a letter indicating the same.	

13.	Valid NCA certificates and Practicing license for the year 2020(Class 5 and above)	

8.1.3 Technical evaluation of bidders

This shall be based on the technical requirements defined in the technical responsiveness checklist below. At this stage only bidders who shall pass preliminary evaluation shall be analyzed. Bidders shall be awarded marks based on the following parameters;

1. Filled tender questionnaire form
2. Evidence of company office location
3. Evidence of company key personnel and their experience
4. Evidence of works of similar nature and complexity completed in the last five years
5. Evidence of ongoing projects
6. Schedule of contractor's equipment and transport (relevant equipment and relevant transport equipment)
7. Company's financial reports (audited financial reports for the last two years showing the company turnover, financial capacity and evidence of available financial resources e.g bank overdrafts extended to the company)
8. Names, addresses, and telephone contacts of the company bankers
9. Company litigation history

Below is the technical responsiveness checklist to be used during technical evaluation;

Technical evaluation criteria (Checklist)

Item	Description	Points Scored	Max. Point	
1	**Tender Questionnaire Form** • Completely filled ---------- 5 • Not filled ---------- 0		**5**	
2	**Office location** • Existent ---------- 5 Nonexistent ---------- 0		**5**	
3	**Key Personnel (Attach evidence)**			**25**
	Director of the firm (attach evidence ie. Academic certificates) • Holder of degree in relevant Engineering field ---------- 5 • Holder of diploma in relevant Engineering field ---------- 3 • Holder of certificate in relevant Engineering field----------2 • Holder of trade test certificate in relevant Engineering field------1 • No relevant certificate ---------- 0		**5**	
	At least 2No. degree/diploma holder of key personnel in relevant field (attach evidence ie **Academic certificates)** • With over 10 years relevant experience ---------- 10 • With over 5 years' relevant experience---------- 6 • With under 5 years relevant experience ---------- 2		**10**	
	At least 2No certificate holder of key personnel in relevant field (attach evidence ie. Academic certificates) • With over 10 years relevant experience---------- 5 • With over 5 years relevant experience ---------- 3 • With under 5 years relevant experience ----------1		**5**	
	At least 2No artisan (trade test certificate in relevant field) • Artisan with over 10 years relevant experience ---------- 2.5 • Artisan with under 10 years relevant experience ---------- 1 • Non skilled worker with over 10 years relevant experience --- 0		**5**	
4	**Contracts completed in the last five (5) years (Max of 4No. Projects)- <u>Provide Evidence (Completion certificates of construction related projects))</u>** • Project of similar nature, complexity or magnitude ---------- 5 • Project of similar nature but of lower value than the one in consideration---------- 3 • No completed project of similar nature ----------0		**20**	

Item	Description	Points Scored	Max. Point	
5	**On-going projects – <u>Provide Evidence (at least 2 No. Projects)</u>** • Project of similar nature, complexity or magnitude---------2.5 • Project of similar nature but of lower value than the one in consideration ---------- 1		5	
6	**Schedule of contractors equipment and transport (proof or evidence of ownership/Lease)**			
	a) Relevant Transport (2 marks per construction vehicle) • Means of transport (Vehicles) attach logbooks or lease agreements for vehicles ---------- 6 • No means of transport ---------- 0		6	12
	b) Relevant Equipment (2 marks per construction equipment) • Has relevant equipment for work being tendered (compactor, grader, concrete mixers etc.) attach logbook or lease agreements ----------6 • No relevant equipment for work being tendered ------ 0		6	
7	**Financial report**			
	a) Audited financial report (last two (2) years) (2018, & 2019, financial years • Average Annual Turn-over equal to or greater than the cost of the project----------8 • Average Annual Turn-over above 50% but below 100% of the cost of the project----------4 • Average Annual Turn-over below 50% of the cost of the project----------1		8	
	b) Evidence of Financial Resources (cash in hand, lines of credit, over draft facility etc.) • Has financial resources to finance the projected indicate **monthly cash flow*** for three months ----------10 • Has financial resources equal to the projected **monthly cash flow***----------6 • Has financial resources less the projected **monthly cash flow***----------3 • Has not indicated sources of financial resources ---------- 0		10	
8	**Name, Address and Telephone of Banks (Contractor to provide)** • Information Provided---------- 5 • No Information Provided---------- 0		5	
9	**Litigation History** • Duly Filled ---------- 5 • Not filled ---------- 0		5	
	TOTAL		100	

Any bidder who scores 80 points and above shall be considered for financial evaluation.

**Monthly Cash Flow =Tender Sum/Contract Period*

8.1.4. : FINANCIAL evaluation of bidders

Only bidders who pass the technical evaluation will proceed to financial evaluation.

During financial evaluation of bids, the evaluation committee shall compute the figures quoted in the BOQs to determine arithmetical errors.

In case of discrepancy between the unit cost and the total cost, the unit cost shall prevail.

In case of discrepancy between amount quoted in words and amount quoted in figures, the amount quoted in WORDS shall prevail.

All quantities MUST be inclusive of VAT and all other taxes payable, including delivery costs.

The evaluation committee shall then rank the bidders from the lowest, to the highest responsive bidders.

8.1.5: DUE DILIGENCE EXERCISE

Kirinyaga University Evaluation team May carry out a due diligence exercise by visiting the premises of the responsive bidders.

The due diligence exercise will be aimed at determining whether the bidder has given a true record of all details indicated in their tender documents.

The committee shall then visit the ongoing or completed project sites for the bidders to determine the quality of works carried out.

Any misrepresentation of facts by the bidders will lead to automatic disqualification of the bidder at this stage of evaluation.

CONTRACT WILL BE AWARDED TO THE LOWEST RESPONSIVE BIDDER. RESPONSIVENESS SHALL BE DETERMINED DURING THE FOUR STAGES OF EVALUATION.

SECTION III CONDITIONS OF CONTRACT

Table of Contents

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 who's 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 labor 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 authorized by the Project Manager, access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

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 or as agreed 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 an 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

X^1 = 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%.

X^{11} = 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 labor 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. Day works

29.1 If applicable, the Day works 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 Day works shall be recorded by the Contractor on Forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the Work being done.

29.3 The Contractor shall be paid for Day works subject to obtaining signed Day works 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 affect 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 authorized by the Project Manager;

(b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 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 favor or disfavor 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: **KIRINYAGA UNIVERSITY**
P.O.BOX 143-10300 KERUGOYA

Name of Authorized Representative: **VICE CHANCELLOR, KIRINYAGA UNIVERSITY**

Telephone: **+254728499650/ +254709742000/30**

The Project Manager is: **VICE CHANCELLOR, KIRINYAGA UNIVERSITY**

The name (and identification number) of the Contract is: **PROPOSED FOOTBRIDGE AT KIRINYAGA UNIVERSITY.**

TENDER NO. KyU/TN/F/001/2020-2021

The Works consist of **ERECTION AND CONSTRUCTION OF THE PROPOSED FOOTBRDGE AT KIRINYAGA UNIVERSITY**

The Start Date shall be **AGREED WITH THE PROJECT MANAGER**

The Contractor shall submit a revised program for the Works within **7 days of delivery of the Letter of Acceptance.**

The Site Possession Date shall be **AGREED WITH THE PROJECT MANAGER**

The Site is located at **KIRINYAGA UNIVERSITY**

The Defects Liability period is **SIX MONTHS**.

Minimum insurance cover shall be;

- **Contractor's All Risk Insurance**

The period between Program updates is **14 Days.**

The amount to be withheld for late submission of an updated program is **THE ENTIRE CERTIFICATE**

The Price Adjustment Clause **shall not apply**

Liquidated ascertained damages is **Kshs 50,000.00 per week**

The Performance Security shall be for the following minimum amounts equivalent as a percentage of the **Contract Price 10 percent (%)**

The Completion Period for the Works is_____ [Weeks] **(Bidder to provide estimated period in weeks in the Form of Tender)**

The rate of exchange for calculation of foreign currency payments is **(AS PER PREVAILING EXCHANGE RATE)**

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

Advance Payment **shall not be granted.**

Percentage of certified value retained (retention money) is **10% of the contract sum**

Limit of amount certified retained is 10%

Interval for application of payment certificates is **Monthly**

Period of honouring certificates is 30days

Performance security shall be from Approved Bank or Insurance

SECTION V - SPECIFICATIONS

Notes for preparing Specifications

1.0 Specifications must be drafted to present a clear and precise statement of the required standards of materials, And workmanship for tenderers to respond realistically and competitively to the requirements of the Employer and ensure responsiveness of tenders. The Specifications should require that all materials, plant, and other supplies to be permanently incorporated in the Works be new, unused, of the most recent or current models, and incorporating all recent improvements in design and materials unless provided otherwise in the Contract. Where the Contractor is responsible for the design of any part of the permanent Works, the extent of his obligations must be stated.

2.0 Specifications from previous similar projects are useful and may not be necessary to re-write specifications for every Works Contract.

3.0 There are considerable advantages in standardizing General Specifications for repetitive Works in recognized public sectors, such as highways, urban housing, irrigation and water supply. The General Specifications should cover all classes of workmanship, materials and equipment commonly involved in constructions, although not necessarily to be used in a particular works contract. Deletions or addenda should then adapt the General Specifications to the particular Works.

4.0 Care must be taken in drafting Specifications to ensure they are not restrictive. In the Specifications of standards for materials, plant and workmanship, existing Kenya Standards should be used as much as possible, otherwise recognized international standards may also be used.

5.0 The Employer should decide whether technical solutions to specified parts of the Works are to be permitted. Alternatives are appropriate in cases where obvious (and potentially less costly) alternatives are possible to the technical solutions indicated in tender documents for certain elements of the Works, taking into consideration the comparative specialized advantage of potential tenderers.

The Employer should provide a description of the selected parts of the Works with appropriate reference to Drawings, Specifications, Bills of Quantities, and Design or Performance criteria, stating that the alternative solutions shall be at least structurally and functionally equivalent to the basic design parameters and Specifications.

Such alternative solutions shall be accompanied by all information necessary for a complete evaluation by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, proposed construction methodology, and other relevant details. Technical alternatives permitted in this manner shall be considered by the Employer each on its own merits and independently of whether the tenderer has priced the item as described in the Employer's design included with the tender documents.

SECTION VI - DRAWINGS

Note 1. A list of drawings should be inserted here

2. The actual drawings including Site plans should be annexed in a separate booklet.

NB: PROJECT DRAWINGS SHALL BE AVAILED TO BIDDERS UPON REQUEST.

BIDDERS ARE ADVICED TO WRITE TO THE FOLLOWING EMAIL ADRESSES REQUESTING FOR THE PROJECT DRAWINGS.

ALL COMMUNICATIONS REGARDING THE PROJECT, INCLUDING ADDENDUMS SHALL BE DONE VIA WRITING.

EMAIL: procurement@kyu.ac.ke / CC: endirangu@kyu.ac.ke

SECTION VII - BILL OF QUANTITIES

Notes for preparing Bills of Quantities

1.0 The objectives of the Bills of Quantities are;

(a) to provide sufficient information on the quantities of Works to be performed to enable tenders to be prepared efficiently and accurately; and

(b) When a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

In order to attain these objectives, Works should be itemized in the Bill of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and content of the Bill of Quantities should be as simple and brief as possible.

2.0 The Bills of Quantities should be divided generally into the following sections:

(a) Preliminaries.

The preliminaries should indicate the inclusiveness of the unit prices, and should state the methods of measurement which have been adopted in the preparation of the Bill of Quantities and which are to be used for the measurement of any part of the Works.

The number of preliminary items to be priced by the tenderer should be limited to tangible items such as site office and other temporary works, otherwise items such as security for the Works which are primarily part of the Contractor's obligations should be included in the Contractor's rates.

(b) Work Items

(i) The items in the Bills of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing, or any other special characteristics may give rise to different methods of construction, or phasing of the Works, or considerations of

cost. General items common to all parts of the Works may be grouped as a separate section in the Bill of Quantities.

(ii) Quantities should be computed net from the Drawings, unless directed otherwise in the Contract, and no allowance should be made for bulking, shrinkage or waste. Quantities should be rounded up or down where appropriate.

(iii) The following units of measurement and abbreviations are recommended for use.

Unit	Abbreviation	Unit	Abbreviation
cubic meter hectare hour kilogram lump sum meter metric (1,000 kg) ton	m^3 or cu m ha h kg sum m t	millimeter month number square meter square millimeter week	mm mon nr m^2 or sq m mm^2 or sq mm wk

(iv) The commencing surface should be identified in the description of each item for Work involving excavation, boring or drilling, for which the commencing surface is not also the original surface. The excavated surface should be identified in the description of each item for Work involving excavation for which the excavated surface is not also the final surface. The depths of Work should be measured from the commencing surface to the excavated surface, as defined.

(c) Day work Schedule

A Day work Schedule should be included if the probability of unforeseen work, outside the items included in the Bill of Quantities, is relatively high. To facilitate checking by the Employer of the realism of rates quoted by the tenderers, the Day work Schedule should normally comprise:

(i) a list of the various classes of labor, and materials for which basic Day work rates or prices are to be inserted by the tenderer, together with a statement of the conditions under which the Contractor will be paid for Work executed on a Day work basis; and

(ii) a percentage to be entered by the tenderer against each basic Day work Subtotal amount for labor, materials and plant representing the Contractor's profit, overheads, supervision and other charges.

(d) Provisional Quantities and Sums

(i) Provision for quantity contingencies in any particular item or class of Work with a high expectation of quantity overrun should be made by entering specific "Provisional Quantities" or "Provisional Items" in the Bill of Quantities, and not by increasing the quantities for that item or class of Work beyond those of the Work normally expected to be required. To the extent not covered above, a general provision for physical contingencies (quantity overruns) should be made by including a "Provisional Sum" in the Summary of the Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a "Provisional Sum" in the Summary of the Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises.

(ii) Provisional sums to cover specialized works normally carried out by Nominated Sub Contractors should be avoided and instead Bills of Quantities of the specialized Works should be included as a section of the main Bills of Quantities to be priced by the Main Contractor. The Main Contractor should be required to indicate the name (s) of the specialized firms he proposes to engage to carry out the specialized Works as his approved domestic sub-contractors. Only provisional sums to cover specialized Works by statutory authorities should be included in the Bills of Quantities.

(e) Summary

The Summary should contain a tabulation of the separate parts of the Bills of Quantities carried forward, with provisional sums for Day work, for physical (quantity) contingencies, and for price contingencies (upward price adjustment) where applicable.

SECTION VIII – STANDARD FORMS

i. Form of Tender
ii. Letter of Acceptance
iii. Form of Agreement
iv. Form of Tender Security
v. Performance Bank Guarantee
vi. Bank Guarantee for Advance Payment
vii. Qualification Information
viii. Tender Questionnaire
ix. Confidential Business Questionnaire
x. Statement of Foreign Currency Requirements
xi. Details of Sub-Contractors
xii. Request for Review Form

FORM OF TENDER

THE VICE CHANCELLOR
KIRINYAGA UNIVERSITY
P.O.BOX 143-10300
KERUGOYA, KENYA
_____ [insert Date]

_____
_____
_____
[Name of Contract]

Dear Sir/ Madam,

RE: TENDER FOR THE PROPOSED FOOTBRIDGE AT KIRINYAGA UNIVERSITY

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. I/We the undersigned hereby declare that I am/we are willing to tender for the contract to perform within._____ **WEEKS** the whole of the works in accordance with the contract documents all to the entire satisfaction of the Project Manager.

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 _____ 2019

Signature _____in the capacity of_____

Duly authorized to sign tenders for and on behalf of _____ [Name of Company] of_____ [Address of Company]

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 of
……20……

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 recognized 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 abovementioned 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 figurers] 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?)

_____ _____ _____ (etc.)	_____ _____ _____	_____ _____ _____	

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 License 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:

	Name in full	Nationality	Citizenship Details	Shares
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

FORM RB 1

REPUBLIC OF KENYA

PUBLIC PROCUREMENT ADMINISTRATIVE REVIEW BOARD

APPLICATION NO……OF……20……..

BETWEEN

…….APPLICANT

AND

…….RESPONDENT (Procuring Entity)

Request for review of the decision of the…… (Name of the Procuring Entity) of ……dated the…day of ……20…….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:-

By this memorandum, the Applicant requests the Board for an order/orders that: -

SIGNED ……. (Applicant)

Dated on……day of ……/…20…

FOR OFFICIAL USE ONLY

Lodged with the Secretary Public Procurement Administrative Review Board on ……. day of ……..20……

SIGNED

Board Secretary

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS

GENERAL ITEMS

Materials generally

All materials shall be new and of the qualities and kinds specified herein and equal to approved samples.

Deliveries shall be sufficiently in advance to enable samples to be taken and tested if required. No materials shall be used until approved; materials, which are damaged in any way, shall be immediately removed from site at the contractor's expense

Alternative to proprietary brands or specified standards

Where materials are specified to a particular standard or by their proprietary names of where fittings are specified by catalogues numbers of description, the contractor may offer alternatives which are of equal quality. In such event the tender must be qualified by listing the various alternatives to be used. The successful tenderer must then subsequently submit samples of the alternative materials to the project manager as soon as practicable after the award of the contract, and must obtain his written approval before purchasing.

Measuring and testing equipment

The contractor shall provide on the site the following equipment for carrying out measuring and control and tests and maintain the same in full working order; if relevant to the scope of the works:

a) Straight edges 3 metres and 4 metres long for testing accuracy of finished surface.
b) 150mm steel cube moulds with base plates and tamping rods to B.S. 1881
c) two 30 metres steel tapes
d) one dumpy or quick set level and staff

Minor details of construction

Minor details of construction which are fairly and obviously intended and which may not definitely be referred to in this specification and/ or drawings, but which are usual in sound building practice and are essential to the works, shall be considered as included in the contract sum.

DEMOLITION AND ALTERATIONS

GENERALLY

The contractor is required to visit the site to establish the nature of the existing buildings to be demolished and ascertain for himself the nature of the works and no claim arising from lack of knowledge in this respect will be entertained. The dimensions and quantities given in this section are approximate and the contractor is referred to the site to ascertain the exact nature of the work.

The items pulling down and alterations are to include both labour and materials and for any shoring needling and temporary works in connection therewith. The contractor must include in his pricing for making good all works disturbed in all trades and carting away all debris.

The contractor must give all the necessary notices and must exercise due care in the demolitions. He must not collapse large sections of walls, floors, etc and must provide all necessary shoring and supports during the demolition.

During demolition the contractor shall keep the debris constantly watered to minimize the dust arising and this shall be included in his prices.

All materials, including rubbish, shall be removed from the site as soon as possible.

The contractor is to erect dust-proof screens to the approval of the project manager where deemed necessary and to remove them on completion of the works, all to the project manager's satisfaction. Such screens shall be deemed to have been priced for.

Materials arising out of demolitions which the Project Manager considers of value should be handed over to the Client.

INTERPRETATION OF TERMS

a) "demolition" shall be deemed to mean cutting away, breaking up, demolishing, pulling down, taking down, removing etc., as the context requires and shall include all cases temporarily strutting and supporting and making good remaining works as necessary, and clearing away and removing from site all debris etc.

b) "remove" shall be deemed to mean taking down, hacking up, breaking down, removing etc., and clearing away from site and all other expenses thereby entailed.

c) "making good" shall be deemed to mean all making good, fitting, facing up, plastering and repainting or match existing work.

d) "to match" shall apply to relevant existing work in design, workmanship and all other respects.

e) "re- fix" shall apply to the existing materials arising from the works and shall mean take from store and fix in new position, including making good, repairing and adjusting as necessary.

EXCAVATION AND EARTHWORKS

DEFINITIONS

Removing trees, hedges and the like

The removal from site of trees, stumping, roots hedges bushes, scrub, under growth and the like shall be deemed to be included with the items for cutting down and grubbing up roots.

Surface level

The term "surface level" shall mean ground level after clearing site.

Clearing site

Clearing site shall include the site of all loose debris and rubbish, bushes, scrub, Undergrowth, vegetable and small trees (i.e. not exceeding 600mm girth) and grubbing up their roots.

Rock

The term "rock" shall mean any natural materials, which cannot be dislodged by a pick and which can only be removed by the use of compressors or by blasting or wedging. This classification does not include materials that can be removed by other means other than drilling and blasting or drilling and wedging, but which for reasons of economy in excavating, the contractor prefers to remove by drilling and wedging. Unless specifically stated thereafter, the contractor must assume that permission to use explosives to remove rock will be refused and he must therefore price for removing rock by compressors etc.

"Tuff" will not be treated as rock for the purpose of extra payment to the contractor under clause d5 of the S.M.M. should isolated boulders of a different harder nature be located in the course of excavations, these will be treated as rock.

GENERALLY

Levels

The contractor shall be responsible for setting up and maintaining an accurately ascertained datum level for the work. Immediately following the issue of the order to commence, the contractor shall carry out and record a check grid of the site which shall be agreed between the Architect and the Contractor within one week of the above order being given: no alterations of levels shall be undertaken until an agreement has been reached and the Architect's instructions have been received.

Nature of the soil

It will be deemed that the contractor has inspected the drawings and the site and consulted all available information concerning subsoil conditions before submitting the tender. In making information available on subsoil conditions, the Employer does not in any way absolve the contractor from his responsibilities, nor is it guaranteed that similar conditions apply to any specific part of the site.

Unauthorized excavations

The contractor is prohibited from making excavations other than those approved by the project manager as necessary for the works.

Borrow pits

No borrow pits will be allowed to be opened on the site.

Termites

The contractor must destroy any termites' nests found within the perimeter of the buildings and within a distance of 20 metres from the building externally and take out and destroy queens, impregnate holes and tunnels with approved insecticide and back- fill with hard materials well rammed and consolidated

MATERIALS

Blinding

Blinding shall be of the same materials as the hardcore bed crushed and graded from 4mm upwards, free from clay, chemical or pollutions, pest, weeds root and rubbish.

Hardcore

Hardcore shall be of good, clean, hard broken stone before placing to pass a 100mm ring and free from all rubbish.

Approved filling for filling under floors

Approved filling for filling under floors shall be clean, dry pit or river sand, excavated materials or subsoil free from clay, roots and any impurities.

Soil for backfilling around foundations

Soil for backfilling around foundations shall be dry, clean subsoil free from clay, vegetable soil, roots and rubbish.

WORKMANSHIP

Generally

The contractor shall control the grading around the building so as to prevent water running into excavated areas or into completed sections of the work.

Removal of obstructions

In the event of any derelict foundations, walls slabs, Kerbs etc., being discovered upon the site of the works they shall, if below new foundations, be completely removed to a level of 150 mm below the level

foundations as instructed by the Project Manager. For graded areas any such obstructions shall be removed to a depth of 600mm below the finished grade.

Filling voids caused by the removal of such obstructions shall be executed for "filling"

Bottoms of excavations to be approved

The contractor shall give the engineer at least 48 hours' notice when the excavations will be ready for inspection. The bottom of every excavation will be inspected by the Engineer and the level thereof agreed between the Engineer and the Contractor. If a good bearing bottom is not obtained at the level shown, the Engineer is to be informed. No concrete is to be laid until the bottom has been approved and the level thereof taken. Any concrete work or other work done before such approval, shall, if so directed be removed and new work substituted after excavations have been approved, at the Contractors expense. Notwithstanding such approval any bottom which becomes water-logged or otherwise spoilt after approval, shall be cleaned out and reformed to the Engineer's approval before any concrete is placed.

Before placing concrete or masonry on rock surfaces, the surfaces shall be leveled off or shelved to a slope not exceeding 25mm per 300mm.

Disposal of excavated material

Vegetable soil shall be spread and leveled where directed by the Engineer on site. surplus excavated where directed or required shall be removed from the site to a tip, the location of which first be approved by the Project Manager in writing. All fees and charges in connection shall be deemed to be included in the Contract Sum.

Excavation below required levels

Should any excavation be taken below the required levels or depth necessary to obtain a suitable bottom, the Contractor will be required to fill in excavation to the proper level with concrete of the same specifications for the foundation, at his own expense

Timbering, planking, strutting, etc

The contractor shall provide all necessary timbering, planking, strutting, etc to uphold the faces of excavation, which shall only be removed when it is safe to do so.

Where the Project Manager instructs or agrees that it is necessary for the safety of the works to leave in certain timbering, planking and strutting etc., such timber shall be measured and agreed before covering up.

Filling

Return filling foundations and filling to make up levels under floors and pavings shall be deposited until the formation level has been approved by the Project Manager.

In no case shall fill be deposited until the formation level has been approved by the Engineer

In no case shall fill be deposited on a muddy foundation. Filling shall be deposited in layers not exceeding 150mm in depth before compaction and shall be compacted by rolling, pneumatic tamping or other approved means over whole of the area.

If necessary the filling shall be allowed to dry or be moistened to the correct moisture content before compaction. The finished surface shall be approved by the Project manager prior to further construction work thereon.

The Contractor shall afford every assistance to the specialist executing site sterilization to enable each layer to be treated.

No excavation or foundation work shall be filled in or covered up until all measurements necessary for the adjustment of variations have been made. Walling shall not be built upon the foundation four days after depositing of concrete.

Consolidation of hardcore

Hardcore shall be consolidated with a roller, vibrating roller, or mechanical runner to a compaction equivalent to that obtained with a 2.5 to 3 tone roller, care being taken that no damage is done to the foundation walls.

Hardcore shall be blinded to receive any membrane, the blinding shall be finished and compacted with fine material which will not cause the membrane to puncture under wheel or foot traffic or by the placing of concrete thereon.

Existing services

Active existing services shall be adequately protected from damage. Where active services are found but not shown on the drawings, the subsequent protection support or relocation shall be as directed by the Project Manager.

Where inactive services are encountered upon the site of the works, they shall be removed or sealed off in accordance with the direction of the Project Manager.

Protection

The contractor shall protect all graded and filled areas from the action of elements. Any settlements or washing away of that occurs prior to acceptance of works shall be repaired and grades re-established to the required elevations and slopes.

Laving polythene membrane

Where joints occur there is to be minimum of 300 mm welted lap of joint made with approved tapes.

The contractor shall ensure that the membrane will not pierce during laying and concreting.

Anti-termite treatment

Anti-termite treatment shall be carried out using "gladiator TC" or other chemical approved by the Project manager in writing diluted to a water emulsion containing a minimum of 1.00% of the chemical.

The treatment shall be applied to the whole area of the hardcore bed and all surfaces immediately prior to the placing of the concrete floor slab at the rate of 7 litres per square metre.

Treatment shall be applied whilst it is raining or to surfaces of filling which are wet. The Contractor's attention is drawn to the fact that these treatments are toxic to animals and human life, and he shall prevent contamination of water supply systems, shall cover up and protect treated areas immediately after treatment and post written notices informing of the treatment at prominent points on the site and the building.

Immediately following treatment, the Contractor shall provide to the Project Manager for onward transmission to the client, a written ten- year guarantees:

Immediately following treatment, the contractor shall provide to the Project Manager to onward transmission to the client, a written ten- year guarantees:

a) that the chemical used complies with this specification and has been used in the concentrations stated herein;

b) that the guarantee shall be continuous for a period of ten years from the date of treatment;

c) that should infestation by any terminates appear before the end of five year period, the Contractor will return and retreat as necessary to eliminate the infestation entirely and at his own cost on each occasion that infestation appears within the ten year period.

The Contractor shall carry out annual inspection commencing three months after treatment and continuing to the end of the guaranteed period to ascertain the presence to eliminate any infestation entirely and at his cost on each occasion that infestation is found.

CONCRETE WORK

DEFINITIONS

Designation of concrete mixes

The various mixes of concrete are designated in the subsequent measured items by the following criteria: -

Nominal mixes; by the weight proportion of whole bags of ordinary Portland cement to fine and course aggregate and by the maximum size of course aggregate. The contractor shall regularly submit details giving specific gravities and moisture content of aggregate.

Tamping

The term “tamping” as used herein in conjunction with the phrase “treating surfaces of unset concrete” shall mean the final compaction and surface finish to be applied top unset concrete beds or the like, with steel shod beam tamper, either manually or mechanically operated unless otherwise stated. The resulting surface shall have a slightly ribbed appearance.

Keying

The term “keying” as used herein in conjunction with the phrase surfaces of unset concrete” shall mean the preparation of bed, or the like, to receive in-situ pavings by raking with a standard horticultural rake whilst the concrete is still green and when the concrete is set and cured, protecting the raked surfaces with a layer of clean sand and removing the sand immediately before the in-situ paving is laid.

Precast concrete units

Unless otherwise described in the measured items, precast concrete units are deemed to be basically rectangular in cross section and rough on exposed faces. Reinforcement bars shall have hooked ends, bedding sand pointing mortar shall be either cement or cement-lime mortar, as appropriate, and units shall be deemed to be fixed by hoisting bedding and building in unless otherwise described.

Nominally non-reinforced units may contain any reinforcement the Contractor may wish to introduce for handling purposes.

GENERALLY

STANDARDS

The whole of Concrete work and testing thereof shall comply with B.S Code of practice no. 110 and with the subsequent clauses of this document and shall be carried out in strict accordance with the working drawing and instruction of the Project Manager.

A competent person shall be employed whose first duty will be to supervise all stages in the preparation and placing of the concrete. All cubes should be made and site tests carried out under his direct supervision. This person shall also be responsible for keeping an accurate record of the dates on which concrete is poured.

Bar bending schedules

The Consultant Structural Engineer will prepare and provide all necessary bar bending schedules and explanatory details.

MATERIALS

Samples

Samples of all materials are to be submitted for approval of the Project Manager at least one week before it is desired to commence deliveries. All condemned materials are to be removed from the site within 24 hours.

Cement

Cement unless otherwise specified shall be that of a brand manufactured in the country or region and approved by the Engineer and shall comply with the requirements of B.S 12 and a Manufacturer's certificate of test in accordance with B.S
12, shall be supplied for each consignment delivered to the site. Provided that the approval of the Engineer is obtained, the cement may vary from B.S 12, in that up to 10% of the total weight may be reactive volcanic ash and the quantity of insoluble residue may exceed that specified by B.S 12.

Portland cement	K.S.02-1262
Rapid hardening cement	K.S.02-1262
Sulphate resisting Portland cement	B. S. 4027

Rapid hardening cement may be used in lieu of ordinary Portland cement only with the prior approval of the Project Manager, provided that all conditions applying to its use are strictly observed. Any additional expense in connection with the use of such cement shall be borne by the Contractor.

The use of high alumina will not be permitted.

All cement shall be delivered to the site in sealed bags bearing the mark of the manufacturer. Rebagged cement, cement in plain bags and cement in torn bags will not be allowed on the site.

Each consignment of cement shall be accompanied by the manufacture's certificate showing that the representative sample of the consignment has been tested and complies with the appropriate specifications. From time to time, as requested by the Project Manager, copies of the cement manufacture's test certificates shall be delivered to the Engineers of his representative on the site promptly, but such documents shall not preclude the Engineer from rejecting any cement which does not in every way comply with the specification.

Any comment which has failed to pass the tests or has been damaged by water or contaminated in any way on site shall immediately be put into bags and removed from the site.

Aggregates

Aggregate shall comply with B.S 882. or K.S.

Each type of aggregate shall be obtained from one approved source, capable of maintain adequate supplies of consistency graded material throughout the Contract.

Aggregates for exposed concrete shall be free from all impurities likely to cause discoloration and shall be of consistent colour throughout the work.

Fine aggregates and sand shall be clean, sharp, coarse, hard material and equal at all times to the samples, which shall be deposited with and approved by the Engineer. The caustic soda test for organic impurities shall show a colour not deeper than that of the standard solution. The settling test for natural sand shall be made and after being allowed to settle for three hours the layer of silt deposit on the coarse material shall not exceed 10%.

The Contractor shall supply all necessary equipment for the testing of fine aggregate and sand for the use of the Project Manager.

Coarse aggregate shall be hard, clean gravel or broken stone from approved quarries and shall be free from earth, decomposed stone, and extraneous matter they shall conform to K. S. 02-95 and shall be "Graded aggregate" 20mm to 5mm. Thin, elongated, friable, flaky or laminated pieces, mica or shale shall only be present in such small quantities as not to affect adversely the strength and durability of the concrete. The amount of fine particles occurring in a free state or as loose adherent shall not exceed 1% when determined by the laboratory sedimentation test. After twenty-four hours in water, a previously dried sample shall not gain more than 10% in weight.

Each grade of aggregate shall be stored in the works in separate heaps so that there shall be no possibly of any inter- mixing. Any materials, which have become inter-mixed, shall be removed from the site forthwith by the Contractor.

If, in the opinion of the Project Manager, the aggregate is dirty or adulterated in any manner, it shall be washed and/or screened by the contractor.

Graded samples of all types of aggregate each weighing 10 Kg., shall after approval, be kept on site behind glass for visual checking of subsequent deliveries for grading, shape, and where applicable, colour.

Reinforcement

Reinforcement shall comply with the following standards:-

a) Mild steel rod reinforcement shall comply with B.S 4449 or K.S.02-22
b) High tensile steel reinforcement shall be either cold worked deformed steel bars of circular/ octagonal section complying with B.S 4461 or hot rolled deformed high tensile bars having a guaranteed minimum yield stress of 4200Kg/sq cm (60,000 p.s.i) and other physical qualities in accordance with B.S 4449.
c) Wielded steel fabric reinforcement shall comply with B.S 4483. All reinforcement shall be in the "diameter and metric "range and the substitution of "square

twisted" or imperial range shall be allowed but only at no extra cost to the Employer.

The contractor will be required to submit at his own expense certified test data of the following characteristics: ultimate tensile stress, yield point stress, elongation, cold bed test. Should such certificates not be submitted by the manufacture, the Contractor shall have the requisite tests made at his own expense at an independent testing laboratory.

Expansion joints- filler and sealers

Filler shall be "Flexcell" impregnated fiberboard joint filler.

Top edges of filler to be covered with plastic tape as a bond-breaking barrier to filling with sealer.

a) sealers to be:-
   i) "pli-astic" grade 99 applied hot with a machine pourer as recommended by the manufactures. Prior to application surfaces to be treated with a brush coat of Expandite No. 3 primer or
   ii) "plastijoin" hard-applied bitumen putty sealant. Prior to application surfaces to be primed as last, or
   iii) "High duty sealer cold applied two part sealant". Porous surfaces to be primed with Expandite No. 20. Primer
b) The appropriate sealers are specified in the measurement work hereafter and must all be applied and used strictly in accordance with the manufacture's printed instructions.

Wall ties

Wall ties shall be provided between all columns and walling at 450mm interval and shall be of 1.3 mm galvanized mild steel strip 25mm wide x 450 mm long.

Water

Water shall be from the mains and kept free of any impurities and acid or alkaline substance in suspension or in solution, and shall be stored in proper storage tanks to the approval of the Project manager.

Storage of materials

Cement shall be kept dry and used in rotation of deliveries. If delivered in bags these shall be stored off the ground in a well-ventilated and weatherproof shed used exclusively for this purpose.

The shed is to be sufficiently large to contain a working stock and provided with partitions or such other means as may be necessary to ensure the effectual separation of the various consignments and type of cement. Stacking of cement in bags over a height of ten bags will not be permitted. Cement may be delivered in bulk containers provided additional suitable arrangements are made for bulk storage on site to the approval of the Project Manager.

Aggregates shall be stored in a mixer positions on drained concrete paved areas, with stout diving walls between different sizes and types of aggregates.

Reinforcement shall be stored by type, size and length, either off the ground or on clean surfaced areas, and shall be kept free from rust.

Proportions of concrete mix

The quantity of cement shall be measured by weight and each batch of concrete is to use one or more whole bags. The quantity of fine aggregate and coarse aggregate shall be measured separately by weigh bathing plant. Volume mixing will not be permitted.

For grading tests the Contractor shall supply and deliver at his own cost to the Nominated Testing Authority, samples of the aggregates which the Contractor propose to use, consisting of not less than 50 kilograms weight in coarse aggregate and not less than 25 kilograms weight in fine aggregate. It is the Contractor's responsibility to ensure that the subsequent deliveries of aggregate conform to the grading analysis of the approved samples.

The proportions of materials to be used for the preliminary cube tests and subsequent batching, shall be ascertained by calculation from the results of the aggregate grading tests carried out by the Nominated Testing Authority.

Preliminary concrete cubes shall be made by the Contractor on site as required by the Project Manager and tested by the Nominated Tested Authority. As a result of these tests definite weights of each material for batching shall be ascertained and agreed with the Project Manager. Thereafter these proportions shall be adhered to throughout the works and may be varied only by instructions given by the Project Manager.

The weight of damp aggregate must be adjusted to take into account the weight of water in the aggregate, and this in turn will affect the amount of water to be added into the mix.

Throughout the carrying out of the Contract, "works cube tests" are to be made from Concrete drawing from newly laid concrete or concrete about to be placed in position, such cubes being made when directed by the Project Manager and in his presence. Such cubes shall be made in 150 mm cube steel or cast iron moulds and shall be marked and cured strictly in accordance with the Appendices of the Code of Practice, and shall be forwarded carriage paid in time for testing at the required age to a testing laboratory to be nominated by the Project Manager.

Three cubes shall be made on each occasion, concrete for each cube being from different batch. Two cubes shall be forwarded in time for testing in twenty-eight days. Each cube shall be marked with the date of casing and a distinctive reference number I accordance with a system agreed by the Project Manager.

Proportions of concrete mix

A record shall be kept of the position from which the concrete for each set of cube was drawn, or to which it was about to be placed.

At least three sets of three cubes shall be cast during each week concrete is being cast including sets of cubes of each quality of concrete used during the period, or at a frequency agreed by the Project Manager.

Concrete is required to have the properties and give the strength in Newton's per square millimeter as follows:-

	class	Min volumetric ration of mix	Max size of Aggregate	Max water to Cement ration by weight	Minimum crushing strength works Cubes in N/Sq. mm	
					7 days	28 days
A	30/20	1: 1:2	20	0.45	23	30
B	25/20	1:1.5:3	20	0.50	19	25
C	20/21	1:2:4	20	0.58	15.5	20
D	15/25	1:3:6	25	0.60	11	15
E	10/25	1:4:8	25	0.60	7.5	10

Proportions of concrete mix

The above properties and crushing strengths are to be considered as the minimum standard that will be accepted in the finished works.

If the strengths required in the table are not attained and maintained throughout the carrying out the Contract, the Contractor will be required to increase the proportions of cement or substitute aggregates at his own cost so as to give concrete which does comply with the requirements of this clause. The Con tractor may be required to remove and replace at his own cost any concrete which fails to attain the required strength as ascertained by the Works Cube Tests.

Testing of materials generally

The Contractor shall include in his tender prices for the execution on his part of operations specified for testing herein and for supply of the requisite equipment. After initial testing and approval of materials, it is the Contractor's responsibility to ensure and to demonstrate by the submission of further similar sample when so required that subsequent deliveries conform to the quality, grading and (where applicable), colour of the approved samples.

Testing of cement

Before work commences and when subsequently directed, the Contractor shall take 6Kg samples in accordance with BS 12 procedure, of cement and deliver this in tins approved by the Project Manager, to an approved Testing Laboratory for testing.

Each consignment of cement to the site shall be accompanied by the manufacture's advice note and forwarded without delay to the Engineer, shall be delivered to the site at least 7 days before it is intended to be used in the works so that the required tests may be carried out without retarding the progress of works

Testing of aggregates

Before work commences and when subsequently instructed, the Contractor shall take the site samples methods given in B.S. 812, or K.S. 02-95 and deliver these to the Nominated Testing Authority for testing.

Such samples shall be submitted for approval at least 7 days before they intended to be used in the works.

Testing of reinforcement

Should the Project Manager require reinforcement to be tested, it shall be tested at the Contractor's expense and representative test pieces of such reinforcement to be used in the works are to be sent to an approved laboratory for testing.

Manufacture's test reports of reinforcement shall be supplied to the Engineer for all reinforcement to be used in the works.

Testing of concrete in the field

a. Trial mixture

Prior to the commencement of the actual concreting work, the Contractor shall make, or have made, preliminary test Cubes in accordance with B.S 1881, using the aggregate from which sample were taken from for grading analyses. Six cubes are to be made on each occasion, 3 for testing at 7 days and 3 for testing at 28 days. The cube strength obtained in the preliminary tests should show crushing strength of at least 11/3 times the specified works cube test strengths.

The preliminary test cubes will be submitted to an approved Testing Authority for crushing, and from the results of these test, definite weights of each material for batching will be ascertained, and agreed with the Project Manager.

If any of the concrete materials are to be varied or obtained from different source, a further set of preliminary Cube tests, using the proposed new materials, will be required.

b. workability

the total water content in the mixture determines its consistency and once a consistency of a trial has been approved it must remain constant throughout the contract.

In order to help the concrete, maintain the desired consistency the slump of an approved trial mix shall be measured and thereafter all mixes must give the slum as the approved slump shall be in order of 75 mm for hand compacted concrete and 35mm for vibrated concrete. The slump test shall be made on concrete actually being placed in the works at the commencement of each period of concrete placing and at such other times as instructed.

c. Test Specimens

The moulds for test cubes shall be of metal and true to shape to give a 150mm cube and shall be well oiled before filling. The mould shall be filled with concrete taken from that actually placed in the works the concrete being selected by the Project Manager from the point as near as possible to the position of placing. The filling of the moulds shall be done immediately after the selection of the sample concrete and in such a way that the concrete in the moulds be truly representative of that in the works.

The concrete shall be placed in the moulds in three layers of equal thickness, each layer being rammed with 25 strokes of a steel bar 40mm diameter, (or equivalent), weighing 2 Kg. If the concrete in the works is to be consolidated by mechanical vibration, the test cube moulds shall be likewise vibrated after filling. Each cube shall be inscribed with the date of manufacture and identification mark.

A record shall be kept for each batch of cubes showing the position in the works, which the concrete represents, the date of manufacture, and slump of the concrete, particulars of the cement and aggregate use, a statement of whether or not the cubes were vibrated and other information relating to the subsequent history of the cubes.

The moulds containing the test shall be stored for 24 hours on the site in a damp place free from vibration. At the end of this period the cubes shall be taken from the moulds and stored damp sand for 20 days in they are to be tested 28 days or for 4 days if they are to be tested at 7 days.

The Contractor shall be instructed about the dispatch of the cubes to an approved laboratory and will pay all costs relating to the tests. A set of three cubes will be required for not more than every 60 cubic metres of concrete placed in the works.

d. Quality of Specimen

The test specimens shall have the compressive strength specified for each quality of concrete at the appropriate age as given herein.

If the required strength is not obtained at 28 days, the Contractor will be required to cut out and reconstruct all work represented by the test specimens at his own expense with all dispatch, always provided the Project Manager may first permit further tests, at the Contractor's expense, to prove the quality of the deposited concrete.

In the case of seven day Works cube Tests proving unsatisfactory, the works may be stopped, but shall not be liable to rejection until the result of the twenty eight-day test is known.

In the event of the results of the twenty eight-day Works Cube Tests Proving unsatisfactory, the work represented shall be immediately be liable to rejection. The Contractor may, however be given the option of cutting three specimens from the completed work subject to the direction of the Project Manager, and preparing therefrom test cubes or cores, which shall be sent to the Test Laboratory for testing as Works Cubes Test.

Should the average strength of these specimens attain the specified Minimum twenty-eight day strength, the work will, subject to the Engineer's discretion, be accepted.

Alternatively, the Project Manager may instruct the Contractor to make a loading test as described hereinafter. The cost of all cutting, preparation of specimen, testing and making good the portions of the structure affected, shall be borne by the Contractor.

The cost of all delays on site due to concrete not attaining the desired strength, or caused by investigation of defects, cutting away and making good, shall be entirely the Contractor's responsibility.

Damaged or materials unsatisfactory

All materials, which have damaged, contaminated or have deteriorated, or which do not comply in any way with the requirement of the specification, shall be immediately removed from site.

No materials shall be stored or stacked on suspended floors without the Engineers prior approval.

Should any of the samples tested be found, in the opinion of the Project manager in any respect unsatisfactory or likely to produce unsound work. The whole consignment or load from which samples were taken will be rejected, and the Contractor shall forthwith remove it from site. Notwithstanding that any sample of the material may have passed the test, the Engineer may later reject such consignment or loads if he shall decide that the quality has deteriorated.

The contractor at his own expenses shall remove from the site, without delay all rejected material. Any delay caused by such rejection will not in any relieve the Contractor from his responsibility with regard to the completion within the limit(s) specified. Any bag of cement that is opened shall be used on the same day or be discarded from the works.

Plant and method

Before the commencement of any work, the Contractor shall submit the following for the Project Manager's written approval: -

a. The concreting method, including the size and type of machines for weighing and mixing concrete and the methods of transporting, placing and compacting.
b. Details of formwork proposals, clearly indicating the general method of construction and assembly, fixing of linings together with positions of joints and the make and type of mould oil proposed.

c. The proposed position and type of every construction joint not already shown in the Project Manager's drawings.

Such approval by the Engineer shall not be deemed to relieve the Contractor of his obligations to comply with any of the provisions herein.

Measurement and mixing

All cement is to be measured by weight, the 50Kg bag of cement being used as a unit. The amount of water shall be the minimum required to produce a dense cohesive concrete of adequate workability, to be determined by trial mixes. This amount shall be accurately gauged and adjusted from time to time to compensate for variations in the moisture content the aggregate by an approved method.

All concrete shall be mixed in batch type mechanical mixer of approved type having a drum rotating about a horizontal or inclined axis. The speed of the drum is to be not more than twenty and not less than fourteen revolutions per minute.

Each mixer is to be fitted with water measuring device capable of accurate measurement to one gallon for one cubic yard mixers and pro-rata for small sizes and so arranged that the accuracy is not affected by variations in the pressure of water supply line. The fine and coarse aggregate and the cement shall be mixed for at least four turns, after which the required amount of water shall be gradually while the mixer is in motion and the concrete mixer for not less than two minutes to a uniform colour and consistency.

The volume of concrete mixed in any one batch is not to exceed the rated capacity of the mixer.

The whole of the mixed batch is to be removed before materials for a fresh batch enter the drum.

Concrete as mixed in accordance with the foregoing shall not be modified by the addition of further water or in any other manner. On the cessation of work, including all stoppages exceeding twenty minutes or any change of type of cement used in the mix, the mixer and all handling plant shall be washed out with clean water. At least one sump test shall be made each day concreting is in progress under the supervision of the Project Manager.

Reinforcement

Reinforcement shall be free from all loose scale, loose rust, oil, grease or similar defects, immediately before placing the concrete. It shall be bent cold exactly to detail similar defects, immediately before placing the concrete. It shall be bent cold exactly to detail using an approved bending machine. Hooks, bends, etc. where not specifically detailed, are to be in accordance with B.S 4466. Each bundle of bent bars shall be clearly tagged with the bar list number.

Reinforcement shall be placed in the exact position shown on drawings with all intersections tack welded or securely tied with 16 gauge soft steel tying wire. The designated cover shall be maintained by approved spacers, chairs, bolsters or ties fixed to the reinforcement. These shall be dense concrete left with a wire brushed surface or be dipped in grout before fixing. These blocks are particularly important where the surface of the concrete is exposed to the weather or dampness.

The Contractor must ensure that the bars are securely fixed so as to maintain their indicated positions during the progress of pouring, tamping or vibration of concrete. Six chairs are to be provided around each column to hold top steel in position and are to be made up of mild steel bars of adequate diameter. The cost of providing and fixing

these steel chairs must be allowed for by the Contractor in his rates of reinforcement generally.

No laps or splices in bars shall be made except those detailed on the drawings without prior approval of the Project Manager. The size and position of the reinforcement bars or mesh shall be approved the Project Manager, before concreting commences. The insertion of reinforcement into concrete already placed the lengthening of bars by welding and re-bending of incorrectly bent bars will not be permitted.

For concrete having exposed surfaces, reinforcement shall be assembled and placed in such a manner as to avoid any damage to formwork faces.

Where reinforced concrete slabs or wall are constructed against tanking, care shall be taken in position reinforcement to avoid damage to tanking.

Unless otherwise shown upon the Engineer drawings, or specified in B.S 8110 the reinforcement bars shall be given the following is greater.

In columns, a cover of concrete of 40mm to main reinforcement or the size of the bar, whichever is greater.

In foundation and column bases a cover of 50mm to main reinforcement or size of the bar, whichever greater.

Inspection of reinforcement

When the placing of reinforcement for a particular section of the works in completed and before concrete commences, the reinforcement will be inspected by the Project Manager and no concrete shall be placed until the Project Manager's approval has been given. The Contractor shall give the Project Manager 48 hours notice of the time when the reinforcement will be ready for inspection.

Formwork

Formwork shall be true to line, level, face and profile and of robust construction, adequately framed, braced, strutted, cramped, tied and propped to restrict deformation due to the constructional loads to not more than 3 mm, and to entirely eliminate deformation of the form faces by warping or buckling, wire ties will not be permitted. formwork shall be grout-tight under all conditions including vibration when specified or used.

Formwork shall be designed to allow prefabrication of conveniently sized elements to facilities ease of handling and assembly, to permit striking without force, shock or any damage whatever to the concrete member or formwork face and permit the removal of sides without disturbing soffits. Propping shall be carried down to an approved bearing, shall not be supported by timber floors and shall be arranged so that formwork may be lowered smoothly.

Re-propping will not be permitted. Provision shall be made for cleaning out and draining.

Formwork shall be constructed of material or lined with materials as may be necessary to achieve the finishes specified herein and in such a manner as to eliminate screw or nail head imperfections.

Before each use, for faces shall be treated with the minimum amount of an approved mould oil necessary to obtain a clean release. Mould oil shall not come into contact with the reinforcement.

The use of cement retarders will not be permitted except where a key for other finishes is required.

Before the placing of the concrete, bolts and fixing shall be in position and cores and other devices used for forming openings, holes, pockets, recesses, ducts or other cavities shall be fixed to the shuttering.

Formwork to soffits of beams shall be cambered upwards to a total rise at the centre of the span of one centimeter per metre of span.

Immediately prior to concreting, formwork shall be thoroughly cleaned out and rechecked. No placing shall commence until the Project Manager has inspected the formwork and given his responsibility for its sufficiency. After striking, formwork shall be cleaned, stacked and protected and before re-use shall be cleaned, stacked and protected and before re-use shall be serviced, made good or replaced with new as may be necessary to maintain the finish standard specified.

Tolerances

The maximum tolerances within which Concrete Work shall be constructed are as follows:

1.	All setting out dimensions, and dimensions, horizontally and vertically	± 5mm
2.	Sections of concrete members	± 3mm
3.	Levels of floor slabs, beams, lintels etc	± 5 mm
4.	Plum of columns and walls in full building height	± 3 mm
5.	Plumbing of columns and walls in full building height	± 6 mm
6.	Inside faces of lift shafts in storey height	± 5 mm
7.	Inside faces of lift shafts in full building height	± 15mm
8.	Concrete cover to reinforcement	± 3mm

No surface intended to be horizontal or vertical shall slope more than 2 mm in I mm. Any surface intended to be horizontal or vertical shall be rectified entirely at the responsibility and expense of the Contractor.

Placing and compaction

No traffic whatsoever, wheeled or foot, shall take place over reinforcement or placed concrete and the Contractor shall provide all necessary stools, walkways, platforms and borrow runs. Concrete shall be placed in its final position as rapidly as practicable by methods which preclude segregation or loss of ingredients and in any case, within 30 minutes from the time that water is added to the mix; compaction

shall be completed before initial set commences. Partially set concrete shall not be re-worked or used. Flowing in formwork shall be avoided by placing and compacting in shallow layers in quick succession.

Concrete shall be placed into the forms from less a height as possible and shall in no case be dropped from a height of more than 1.5 m except with the approval of the Project Manager.

When chutting is used, the inclinations of the chute must be such as to allow the concrete to flow without the use of excessive water and without segregation or loss of the ingredients. Details of any proposed chutting plant must be approved by the Project Manager before the plant is delivered to the site.

If the contractor wishes to distribute concrete by means of pumps, full details of the system must be available to the Engineer for approval.

Concrete shall be thoroughly compacted and carefully worked with suitable tools, into formwork and round reinforcement and fixtures so as to avoid displacement. A competed steel fixer shall attend throughout concreting to correct any unavoidable displacement.

Compaction shall be by means of vibrators: these shall be of an approved pattern, of the immersion type; clamp on external vibrators in adequate numbers shall be used only where the density of reinforcement shall be avoided. Vibration shall be executed by a competent operative and shall not be carried out to the detriment of adjacent partly hardened concrete.

An accurate record is to be kept by the Contractor showing dates and times when various portions of work were concreted. The concreting foreman must not vary the approved mix or water content without the permission of the representative of the Project Manager. It may occasionally be found that in constricted structural members or where the proportion of reinforcement to concrete is high, the workability of the concrete must be increased locally in order to affect full compaction. Such increase in workability shall be achieved by an increase in mortar content of not more than 10% of the concrete by weight in any single batch and must be made only with the approval of the representative of the Project Manager.

The workability of the concrete must never be altered by the use of additional water or sand alone.

Foundations shall be placed their full depth in one operation and the top surface carefully levelled. Concrete placed in timbered excavations shall be well rammed close against the excavation face as the timber is withdrawn.

Where the design of work demands the placing of reinforced concrete against the sides of excavation without the use of formwork, the earth face in such locations be prevented from crumbling or washing into concrete during placing and compaction by any efficient means, and care shall be taken to maintain the correct cover to the reinforcement.

All concretion shall be continuous to completion or to approved construction joint.

During placing of all concrete, a workman shall be in constant attendance with a hope pipe to wash off any cement slurry which appears on the face of any previously poured concrete immediately it occurs.

Concrete shall not be poured in forms to a depth exceeding 1.5m without the prior approval of the Project Manager.

Column plinths

Column kicker plinths not cast monolithically with the beam or slab will be allowed only at the discretion of the Project Manager and special precautions must be taken if permission is granted especially in regard to the quality of the mix used and the curing of the concrete.

Blinding concrete

No casting of any concrete on the ground shall take place until the ground has been passed as satisfactory by the project manager. All ground to carry reinforced concrete shall be covered with a blinding layer of concrete class 'E' of the thickness shown on the drawings, or if not so shown, a minimum of 50mm.

Waterproof concrete.

Wherever water proof concrete is shown on the drawing it shall be Class A nominal and it shall be compacted by mechanical vibration so that a dense and homogeneous mass of concrete is obtained throughout every pour of the structure, all in accordance with C.P. 2007.

The Contractor shall be allowed at his own cost to add an approved waterproofing addictive to the mix using it strictly in accordance with the maker's printed instructions.

All permanent and construction joints shall be constructed in accordance with the drawings and Specification to achieve complete water tightness.

It shall be Contractor's responsibility to ensure that all structures required to be constructed in waterproof concrete are completely watertight and any work found to be defensive shall be made good to the Engineers satisfaction at the Contractor's expense.

Where waterproof concrete forms a water retaining structure it is to be tested by filling with water for a period of not less than four days.

Any percolation or porous concrete or leaking joint is to be made good at the Contractor's expense. Tanks and pools constructed below ground level are not to be backfilled prior to the satisfactory completion of this test.

Construction joints

All construction joints shall be straight, truly vertical or level as the case may be, of profile shown and formed in the exact positions shown on the drawing or if not shown on the drawings, with the prior approval of the Project Manager. Vertical joints shall be formed against adequately secured rigid stop boards having splayed fillets,designed to pass the continuous steel reinforcement without temporary bending or displacement.

The rate and method of placing concrete and the arrangement of joint bulkheads shall be such that the concrete between construction joints shall be placed in a continuous operation.

Joints in reinforced slabs and beams shall be perpendicular to the axis or surface of the member jointed and at one third of the span. If an intersecting member occurs at that point, the joint shall be located at a point of minimum shear.

Construction joints in columns shall be as shown on the drawings. Whenever it becomes necessary to stop work, such stops shall be located at one third span of slab and beams or as directed by the Project Manager.

An adequate and acceptable key for succeeding work shall be formed by using stop boards, which shall be constructed tightly to prevent any grout leak. As early as possible board shall be removed and the surface thoroughly hacked and brushed to remove all laitance.

Any leakage past stop boards shall be hacked off as soon as the concrete has set. The surface shall be left clean and dry. Immediately prior to further concreting the joint face shall be soaked with water and covered with cement/ sand mortar of proportional identical to that in the concrete to be placed punned into the body of the set concrete.

For exposed finishes, care shall be exercised to preserve an unbroken line at the exposed edge of the joint.

In no circumstances shall the concrete be allowed to finish at a break running down a rough slop. Such cases, if found will be treated as contrary to the specification and the Contractor will be required to cut out the member and re-cast. In the case of horizontal joints any excess water and laitance shall be removed from the surface after the concrete is deposited and before it has set.

Before casting slabs the haunchings or seatings for the slab shall be thoroughly hacked, scored and washed and covered with a least 5mm mortar immediately before the slab is cast.

Any necessary construction joints in foundations shall be stepped and lapped 600mm. Joint faces shall be prepared and treated as described above.

Striking times

It shall be the Contractor's responsibility that no distortion, damage, overloading or undue deflection is caused to the structure by the striking of formwork, but the Engineer reserves the right to delay the time of striking in the interest of the work. Formwork shall not be struck until the concrete has sufficiently hardened. Approval of the Project Manager shall not relieve the Contractor of his liability to make good any concrete damaged by premature removal or collapse of forms. In no circumstances shall forms be struck until the concrete reaches cube strength of at least twice the stress to which the concrete may be subjected at the times of striking.

The following striking times given in (24 hours) are the absolute minimum that will be permitted:-

Form	Ordinary Cement	Portland Rapid Hardening Cement
Walls, Columns (unloaded) Beam sides	2	2
Slabs – props left under	4	2
Beams soffits – props left under	7	5
Slabs – props	10	5
Beams – props	18	8

The time for removal of forms as set out shall not apply to slabs and beams spanning more than 10 metres. For such spans appropriate times shall be recommended or advised by the Project Manager.

Curing

The curing of the concrete must receive particularly careful attention. The concrete shall be covered with a layer of sacking, canvas, hessian or suitable absorbent material, and concrete, formwork and covering kept constantly wet for the first seven days after casting.

Holes and chase casting in

No holes chase are to be cut in reinforced Concrete Works. The Contractor shall ensure that all necessary holes and chases, including fixing holes for railings and balustrades, e.t.c., are carefully formed in the correct position by requisite measures prior to the placing of concrete.

All conduits, pipes, tubes and the like shall unless otherwise detailed, be run on top of the bottom reinforcement of the concrete work. It shall be the Contractor's responsibility to ensure full co-ordination with Sub-Contractors in the setting out for this purpose.

Generally, conduits, pipes and special fixtures shall be concreted in where required and in exact positions demanded.

Concrete fixing blocks shall not effect the strength or cover of the structure nor effect finished work due to movement or other cause.

Details of positions of all holes, chases and fixing blocks shall be submitted to the Project Manager for his approval prior to putting the work in hand.

Tests of completed structural members

The Project Manager shall instruct that a loading test be made on the works, or any a part thereof, if in his opinion such a test be deemed necessary for one or more of the following reasons:-

a. The site – made concrete test cubes failing to attain the specified strength.
b. The shuttering being prematurely removed,
c. Overloading during construction of works, or part thereof
d. Concrete improperly cured,
e. Any other circumstances attributable to negligence on the part of the Contractor which, in the opinion of the Project Manager, may result in the works, or part thereof, being less than the required strength.

If the loading test be instructed to be made solely, or in part, for one or of the reasons mentioned above, the test shall be made at the Contractor's own cost. If a test instructed is to be made for other reason than specifically stated above, the Contractor shall make the test and shall be reimbursed for all costs relating thereto, provided the test results show the concrete to be satisfactory.

Loading tests are to be in conformity with Clause 605 of British Standard Code of Practice C.P 114.

If the result of loading test be not satisfactory, the Project Manager shall instruct that the part of works concerned shall be taken down or removed and reconstructed to comply with this specification, or such other remedial measures shall be taken as to make the works secure.

If the tests be instructed to be made for one or more of the reasons (a) to (b) inclusive as herein before specified, the Contractor shall take down or remove and reconstruct the defensive work or shall take the remedial measures instructed all at his own cost.

Protection

All in-situ and precast concrete shall be protected from rain and during hot, dry and windy weather approved hessian covering constantly damp shall be used to prevent premature drying out.

All in-situ and precast concrete shall be protected from damage by disturbance, shock vibrations, early loading or overloading. In addition all exposed finishes shall be constantly protected from mechanical damage to arise or faces and damage due to dropping flashing and staining from any source including rusty scaffolding or reinforcement.

No materials or equipment of any kind shall be stored or staked on suspended floor without the Engineers prior approval.

Precast concrete

Precast concrete lintels shall comply with B.S .5977 Part 2

Precast concrete Kerbs shall comply with B.S.340, Figure 5

Concrete shall be cast in properly made strong moulds to form shapes required. For work described as “finished fair” the mould shall be lined with sheet or other approved material.

The coarse aggregate for precast concrete shall be 10mm gauge for the mix specified.

The concrete shall be the mixes described and shall be thoroughly tamped in the moulds and shall not be removed from them until seven days after placing the concrete, but the sides may be removed after three days providing the moulds are such that the sides are easily removable without damaging the concrete.

The precast work shall be cast under the sheds and shall remain under same for seven days in the moulds and a further seven days after removal from the moulds. During the whole of this period the concrete shall be shielded by sacking or other approved material kept wet.

It shall then be removed from the sheds and stacked in the open for at least seven days to season.

Precast units shall be true and smooth on all faces (except where key is required for applied finishes). All arises shall be true and clean with no broken edges.

All units shall be marked during manufacture to indicate:-

a. The edge of casting
b. Identification lettering in accordance with the drawings
c. Where necessary, the way up for building in.

Ends of bar reinforcement shall be 25 mm from internal faces and 40 mm from external faces. Nominally non reinforced units may contain reinforcement at the Contractor’s option for handling purposes, the cost of which shall be deemed to be included in the Contract Sum.

<u>Surface finishes</u>

After removal of shuttering, unless instructed to the contrary, the face of exposed concrete is to be rubbed off immediately to remove fins or other irregularities. In the event of parts of the concrete being honey combed, such portions are to be cut to the depth and shape required by the Engineer and made up with fine concrete of equal quality in such a manner as shall be directed. The face of the concrete for witch shuttering

is not provided, other than slabs, is to be smoothened with wooden float to give a finish equal to that of the rubbed-down surface where shuttering is provided.

The top face of slab which is not intended to cover with other material is to be leveled and floated before setting to a smooth finish at the level or falls shown on the drawings or elsewhere. The floating must be carried out in such a way as will prevent an excess of mortar being brought to the surface of the concrete. The top face of slab

intended to be surfaced with mortar, granolithic or similar material is to be brushed with a stiff broom while still green to removed any laitance and provide a roughened surface.

a. Samples
Before the execution of any specified finish, the Contractor shall prepare 1200 mm square sample, for the Engineers approval. No concreting in finish works shall be attempted until after the approval of a sample. Approved samples shall be retained till the completion of all such work and closely adhered to throughout the work. Rejected samples shall be demolished and removed.

b. Rendered or plastered surfaces.

Concrete surfaces to be rendered or plastered shall be thoroughly hacked to form a good key.

c. Fair faced surfaces.

Fair faced surfaces shall be free from honeycomb, stains fins lippings, nail holes or excessive air holes and shall be uniform in colour and texture. This surface shall be obtained by the use of:

(i) Wrot form, i.e. timber forms planed smooth on the surface in contact with the concrete.
(ii) Forms lined hardboard or plywood or other material, or
(iii) Smooth steel forms.

All imperfections shall be cut out, made good in cement mortar and rubbed down with carborundum stone and finally bag-rubbed with cement slurry to finish to a high standard without trace of shuttering mark, joints or other disfigurements.

WALLING

GENERALLY

Testing

The Contractor shall, as and when required by the Engineer, submit and deliver samples of any materials for testing in accordance with the relevant current B.S specification. Samples of mortar, when required are to be delivered in watertight boxes provided by the Contractor.

Samples and sample panels

Samples of all types of block, bricks and stone required for the works shall be to the Engineer for his prior written approval before any orders are placed.

After approval of samples, the contractor shall erect a 1200mm x 1200mm sample panel of brickwork, stone or any fair face block work required by the Project Manager. No work shall be commenced until written approval has been given to sample panels, which shall be maintained for the duration of execution of the works to which the sample applies.

The work executed shall not be inferior in any respect to the approved sample. Inferior work shall be taken down and removed if required by the Project Manager. The cost of

providing samples and sample panels shall be deemed to be included in the Contract Sum.

MATERIAL

Cement

Cement shall be as described in Concrete Work.

Fine aggregate

Fine aggregate for concrete blocks shall be as described in Concrete Works.

Coarse aggregate

Coarse aggregate for concrete blocks shall be good, hard, clean aggregate from approved quarries. It shall be free from all decomposed materials and shall be graded up to 10mm and all as described for course aggregate in Concrete Work

Limes

Hydrated limes for cement/lime mortar shall be semi- hydraulic or non-hydraulic calcium limes. Lime/sand mortar shall be hydraulic.

Sand for mortal

Sand for mortal shall comply with B.S 1200 Concrete blocks.

Concrete blocks for walling shall be provided by the Contractor complying with B.S. 6073 part 1 and made in approved block making machines of a composition as follows:

Portland cement	1 cubic metre
Fine aggregate (grade up to 5 mm)	3 cubic metre
Coarse aggregate (grade up to 10mm)	6 cubic metres

Blocks shall be solid or hollow two-hole type as specified and are to be made under sheds erected by the Contractor to the directions and approval of the Project Manager. Samples shall be approved by the Project Manager any walling work is commenced.

The compressive strength of non-loading bearing shall be not less than: -

Average of 10 blocks	3.5 N/mm2 gross area
Lowest individual block	2.8 N/mm2 gross area

When load bearing, the compressive strength of blocks shall be:-

Average of 10 blocks	7.0N/mm2 gross area
Lowest individual block	5.6N/mm2 gross area

All testing shall be in accordance with B.S. 2028

The concrete is to be put into the machine's moulds in thin layers and all properly tamped therein. On removal from the machines blocks are to be carefully deposited on racks under sheds erected by the Contractor to the direction and approval of the Project Manager and there left for three days and kept thoroughly wet the whole time, after which they shall be put out in the open on racks and protected with approval matting, sacking or straw and kept wet for further five days, then kept in the same position and under same mat cover, but without wetting, for a further two days and then left in the open without matting for wetting or a further seven days to season.

The blocks must be left with good sharp edges. The blocks in use for works shall be 200mm high and may vary in length from 300mm to 450mm and no variations above or below these lengths will be allowed except where required to form proper bonding at corners, around openings sills, lintel, beams, etc. and the like positions and the Contractor must make or cut blocks to all varying sizes required for these purposes and include this in his price.

Blocks to be subsequently covered with an in-situ finishing may be slightly rough in texture. Fair face blocks shall be perfectly smooth.

Precast concrete louvre or screen blocks

Precast concrete louvre or screen blocks shall comply in all respects with the specification for precast items contained in the preambles to 'Concrete Work' and shall be constructed to the dimensions and form shown in the drawings.

Stone

Stone shall be sound and hard and free from all defects and shall be obtained from a quarry approved by the Project Manager.

Storage of materials

a) Cement and Limes shall be stored off the ground, under cover and away from damp, and in such a manner to enable them to be used in rotation in order of delivery.

b) Sands shall be stored separately according to type and on clean, hard dry stand and protected from contamination.

c) Sands for pointing shall be stored separately, away from other sands and shall be obtained in sufficient quantity at one time to enable materials of the approved colour to be used for the whole of the work.

d) Blocks and bricks shall be open stacked to permit ventilation and protected from the sun, rain and rising damp.

Wetting blocks and bricks

Concrete blocks and bricks or grille blocks shall be wetted as necessary before and after laying.

Walls shall be kept wet for three days after building.

Bonding walls

The blocks shall be properly bonded together and in such a manner that no vertical joint in any one course shall be within 115 mm of a similar joint in the course immediately above or below. Sufficient through bonders shall be provided as directed by the Engineer. Alternative courses of walling at all angles and intersections shall be carried through the full thickness of the joining walls. All walling shall be built up entirely solid in blocks, without voids, allowance being made for joints 10mm thick only.

All perpends; reveals and other angles of the walling shall be built strictly true and square.

Generally

The Contractor shall provide all setting out rods

All block work and brickwork shall be built uniform, true and levels, with all perpends vertical and in line. No work shall rise more than 1 meter above adjoining work and all such risings are to be properly racked back in long steps to prevent crack. Rising and all walls shall be leveled around at each floor.

Joints generally are not to exceed 10mm in thickness. Cutting of block work against concrete soffits, etc. shall include for cutting to give normal 10mm joints and complete filling thereof with mortar.

All walls built in hollow concrete blocks, where finishing with an open to edge, (i.e not against ceiling, beams, etc), or at the underside of sills, shall be finished with a solid concrete block top course.

Where walling is to be fair faced in block work the blocks shall be selected and shall all have clean arises. The blocks are to be built to a true and even face with the joints finished as specified hereinafter.

Openings for wooden doors, frames ventilators, etc., are to be set out and left unbuilt until the wooden frames have been fixed in position.

Openings for metal frames are to be wide enough for the frames to fit without being forced into position. Built the lugs into the joints of the walling and fill the space between the walling and the frame with cement mortar well tamped into the channel of the frames and point all around externally.

Wall reinforcement

Where described walls and partitions shall be reinforced with a 25mm wide strip of 1mm thick hook iron built into alternate horizontal joints in the wall centre. The reinforcement shall be lapped and hooked at the running joints, angles and intersections and carried at least 115mm into abutting walls at junctions.

Mortar mixing

The constituent materials shall be measured separately when dry in specially prepared gauge boxes of sizes given the proportions specified without consolidation of the contents by ramming and shaking. The mortar shall be mixed in an approved power driven mixer for not less than two minutes per batch and using the minimum quantity of water necessary to obtain a working consistency. The mixer shall be used as close as practicable to the works and mortar shall be used within 30 minutes of mixing. No partially or wholly set mortar will be allowed to be used or re-mixed

Chasing

When walling is cut, holed or chased for conduits, pipes or the like, all such chases shall be filled in solid in cement mortar mix (1:4) prior to the application of finishes. In no case shall a vertical chase be deeper than one-third the thickness of the wall and in no case shall a horizontal chase be deeper than one-sixth the thickness of the wall.

STRUCTURAL STEEL

DEFINITIONS

Holes for attachments

Where lugs or other subsidiary members are given in the description of main members of plates, bars sections or tubes, holes required for the screws, bolts or rivets by which the subsidiary members are attached to the main members shall be deemed to be included.

Welding

In the absence of specific requirements the technique and materials employed in welding shall be selected with due regard to the character of the work and the metal being connected.

GENERALLY

Shop drawings

The contractor shall submit complete shop drawings as and when required by the project manager for his approval.

Standard of construction for structural work

Structural metalwork and testing shall comply with the relevant causes of B.S. 449 part 2.

Fabrication of Structural metalwork

Structural metalwork shall be fabricated by a specialist firm and before an order is placed by the contractor; such specialist firm shall be approved b the Engineer.

Shop details for structural work

The contractor shall include for the preparation of all shops details for structural work from the drawings supplied by the Engineer. All such details shall be approved in writing, by the Engineer before the work is put in hand. Every drawing shall show the number and sizes of all rivets and bolts, complete details of welds, type of electrodes, welding procedure, whether the welds are to be made in the shop or elsewhere and any other relevant information.

Accuracy of drawings

The contractor shall be responsible for the correctness of his shop details and for shop fittings and site connections.

Dimensions to be verified

The contractor shall take the dimensions from the site of buildings and he shall verify all dimensions given on the drawings before the work is put in hand.

MATERIALS

Steel generally

The steel used for (i) hot rolled steel products (ii) cold-formed steel products and (iii) hard drawn steel wire and steel sections shall comply with the relevant B.S. or K.S. 02-18 as approved by the engineer. Where applicable this standard shall overrule any other standard hereafter stated.

Steel for general metalwork

Mild steel shall comply with B.S. 4360, Grade 43a1 of 43A. Hot rolled sections shall comply with B.S. 4, Part 1 Hot rolled hollow sections shall comply with B.S. 4848, Part 2. Tubes (other than circular hot rolled hollow sections) shall comply with B.S. 6323 and shall be of the type of steel and method of manufacture described.

Steel for structural metalwork

(a) All structural mild steel shall comply with B.S. 449 Part 2 and B.S. 4360.
(b) All structural steel tubes shall comply with B.S. 1775 and B.S. 449 Part 2.
(c) Mild steel and medium tensile steel electrodes for metal-arc welding shall comply with the requirements of B.S. 639.
(d) All mild steel bolts and nuts shall have a tensile strength of not less than 432 N/mm^2 (38 tons/in) (37 tones/in^2).
(e) All high tensile bolts, nuts and washers have a minimum tensile strength of 570N/mm2 (37tons/in^2)
(f) High strength friction grip bolts and washers shall comply with B.S. 4395 Part 1.
(g) All plain washers shall be of steel. Tapered or other specially shaped washers shall be made of steel or malleable cast iron complying with B.S. 3410.

Cast Iron

Cast iron shall comply with B.S. 1452

Galvanised work

Galvanised plain steel sheets shall be to the standards approved by the Engineer. Zinc sprayed iron and steel shall comply with B.S. 2569 Pat 1. The nominal thickness of zinc coating shall be not less than 0.102mm and at no point less than 0.07-mm.

Bolts and nuts

Bolts and nuts shall comply with B.S. 1494 and B.S. 916 (imperial) or B.S. 4190 (metric).

Aluminium

Wrought aluminium shall be of the alloys described and shall comply with the following:-

Plate, sheet and strip	B.S. 1470
Drawn tube	B.S. 1471

Extruded round tube and hollow sections, bar and rods,- to approved manufacturer's specification.

WORKMANSHIP

Smithing, etc.

All smithing and bending shall be soundly and neatly executed, care being taken not to overheat.

Forging

All straps bolts and similar work shall be forged neat and clean from the anvil.

Welding

The word 'welded' is to be understood to include the normal trade methods of jointing metals using electric are welding apparatus or an oxyacetylene torch, rod and flux. The joints shall be made so that they will transmit the loads and resist the stresses to which they will be subjected. All excess metal is to be filed down and smoothed off to a workmanlike finish to the approval of the Engineer. The materials employed in welding shall be selected with due regard to the character of the work and the metals being connected.

Structural work generally

The whole of the fabrication and erection of the structural metalwork shall be carried out in accordance with B.S. 449; Part 2. The welding of steel to B.S. 4360 must conform to:

B.S. 1140 – "General requirement for the spot welding of light assemblies in mild steel", or

B.S. 5135 – "Metal is welding of carbon and carbon manganese steels" as applicable.

For welding any particular type of joints the contractor shall provide evidence acceptable to the project manager that the welder has satisfactorily completed the appropriate tests as described in B.S. 449, part 2, chapter 6. Any welders testes shall be made at the contractor's expense and shall include the cost of any

fees incurred b the Employer for witnessing of, or making such tests and any other instructions the project manager may give from time to time during the progress of works.

Fabrication

As much of the work of fabrication of the structural metalwork as reasonably practicable shall be completed in the manufacturers works. Field connections shall be made in accordance with the approved drawings. The contractor shall give four day's clear notice of structural metalwork ready for inspection at the manufacturer's works, to facilitate inspection before delivery.

Joints and connections

No variation of the number, type or position of the joints or connections shown on the drawing of structural metalwork shall be made without the consent of the Engineer. I f such consent is desired the contractor shall submit detailed drawings of the proposed joints for the approval of the project manger and no extra cost incurred by reason of such additions of alterations will be allowed to the contractor.

Painting at works

Where described as primed at works, structural metalwork shall be freed off rust, mill scale, welding slag and flux residue and shall be dry immediately prior to painting with primer.

For joints wit high strength friction grip bolts the contact surface shall be left unpainted but special care shall be taken after assembly to paint all edges and corners near the joints together with bolt heads, nuts and washers to prevent the ingress of moisture. For joints made with other bolts and rivets the contact surfaces shall each be given a coat of priming paint and for shop connections the contact surfaces shall be brought together while the paint is still wet.

For welded connections where the contact surfaces are not completely sealed the contact surfaces shall be painted to within 50mm of the edges that are to be welded. The primer shall be touched up with similar primer if damaged by subsequent handling.

Welded members to be galvanised

All galvanised members which are to be welded shall be galvanised only after all fabrication is complete.

Metalwork to be painted

All metalwork which is to be painted shall be painted with one coat of primer before fixing.

FLAT ROOF WATERPROOFING WITH EPDM RUBBER

SPECIFICATION OF WATERPROOFING MATERIAL

The waterproofing material shall consist of a single ply VARNAMO EPDM RUBBER, shall not be less than 1.2mm thick and shall have the properties specified below (unless otherwise agreed at the time of award of the contract).

The membrane material shall be supplied by the manufacture in the sheets (or rolls) large enough to minimize jointing which shall be capable of forming single bents in-situ. At the points where the membrane goes over parapet, proper care shall be taken to seal the edges per manufactures specifications, including chiseling grooves to tuck in the rubber.

Before fixing the waterproofing membrane, the substrate must be smooth, clean, dry, free of oil/fat, sharp edges and foreign materials. All bituminous waterproofing materials previously used must be removed in total and carted away. The membrane shall be adhered to the substrate at least 50%, using an adhesive specified by the manufacture.

The rubber surfaces shall be painted with two coats of rubberized paint as manufactured by Crown Paints, to give a grey finish or any other colour that may be specified. Areas as specified in the drawings, prone to mechanical damage shall be protected by installing paving tiles.

The application of waterproofing membrane shall be carried out by a specialist sub-contractor who is to be specifically approved by the Architect and will be required to give a TEN YEARS GUARANTEE against workmanship backed by a similar guarantee for materials from the MANUFACTURES. Such a SUB-CONTRACTOR will have a demonstratable experience in installing such materials in East Africa

	PROPERTY	TEST OR DEMONSTRATION	REQUIREMENT
a)	Thickness / Uniformity	BS 903 Part A38	In the range of +3% to 5% stated thickness
b)	Tensile strength and elongation	BS 2782 Method 210 A	Minimum tensile strength at beak 4 kN/m Minimum elongation at Break 350%
c)	Tear strength	BS 903 Part A3	Minimum tear strength 8 N/mm
d)	Thermal expansion	Change of dimension 100^0C	Maximum +1%
e)	Resistance to aging and weathering	DIN 7864 Heat aging at 80	Tensile strength maximum degrees change on (b) after 28days 20% elongation at break, maximum change on (b0 above after 28days 20%
f)	Deteriorating by lime	DIN 7864	Tensile strength, maximum change on (b) above after 28 days 20% elongation at break
g)	Ozone resistance	BS 903 Part A4	No visible cracking under 7xMagnification after being exposed under strain to the standard ozone

			rich atmosphere
h)	Robustness	Contractor to provide evidence for similar work	The material must be sufficiently robust to be suitable for installation on the basis foreseen in the contract.
i)	Bio-degradation	Contractor to provide evidence for similar work	The material shall be immune to bacterial attack when installed on site
j)	Chemical resistance	Contractor to provide features of supply material	Good resistance to corroding substances with which the material may come in contact in installed conditions at the site

VANDEX PRODUCTS

SPECIFICATION FOR WATERPROOFING CONCRETE STRUCTURES

Preparatory work

All areas shall be examined for structural defects.

Shrinkage cracks exceeding 0.3mm (0.01") in width shall be cut or chiseled out at least 10mm wide and 15mm deep and washed out. Then a slurry coat of VANDEX super shall be applied. Following this the groove is filled with a mixture of 3 to 1 sand and shall cement in stiff mortar consistency.

Over-poured forms, around columns and/or inverted beams, form grooves shall be cleaned out, rinsed with water and slurry coated with VANDEX super. These grooves shall then be filled flush with a mixture of 3 to 1 sand and cement.

Any honeycombed concrete found in walls and /or inverted beams/columns shall be raked out to solid concrete, washed out with water, coated with a slurry coat of VANDEX super and filled out with a 3 to 1 mixture of sand and cement.

Cleaning

Concrete surfaces shall be thoroughly wetted down in order to achieve the penetration of the activated chemicals, and thereby starting the crystalline growth throughout the capillary tracts.

All free lying water must be removed from surface, leaving the concrete in a damp condition just prior to VANDEX application

Mixing

VANDEX super is mixed to slurry consistency. Add approx. 0.8 parts water to 2.0 parts powder or 9 litres to 25 Kg when mixing full bags, and mix thoroughly until the mixture is free from lumps.

Application

The pre-watered concrete surface shall receive two coats of VANDEX super each coat approx. 0.75 Kg/sqm. Use a VANDEX brush and work the material well into the surface.

The application should be as even as possible trying to avoid thick and thin spots. Areas applied too thick will not cure right and when drying cracks and subsequently peeling may form.

The second coat may be applied when the first coat has set and is not drawn off by the second coat.

Curing and protection

VANDEX applications must be protected against sun and rain. After the application is dry to the touch, cover with polyethylene sheet (Hessian cloth) or wet sand for five days. If this is not possible, sprinkle with water several times a day for five days. Do not apply VANDEX materials at temperature below 5 degrees C or on super cooled structures.

Additional information

When concrete is poured in sections, it is recommended that each section is keyed. After keyed form is removed and just prior to pouring the next section the construction joint shall receive a slurry coat of VANDEX SUPER (1.5 Kg/sq.m.)

This does not apply to control or expansion joints.

ROOFING

"RESIN COT" PRE-PAINTED MILD STEEL/G.C.I. SHEETING

Generally

Pre-painted corrugated mild steel sheeting shall be No. 24 Gauge of best quality in accordance with B.S. 3038, and shall be as per Mabati Rolling Mills Ltd manufactured products or other equal and approved. Where stated aluminium sheets, they should conform to a specified and approved thickness.

Laps

Sheets shall be laid wit 150mm end laps and side laps of 30mm corrugations on the side away from the prevailing wind.

Fixing of Steel and Timber

The sheets shall be fixed to mild steel angle purlins with 6mm diameter pre-painted mild steel hook bolts 50mm longer in the shank than the depth of the steel purlins to which they are fixed each with one diamond shaped bitumen washer, one, pre-painted steel to timber purlins by using 14 gauge drive screws with bituminous felt washer backed by cranked diamond shaped aluminium washer.

Holes

Holes for bolts or screws shall be punched from the inside of the sheet and through the ridges of corrugations NOT in the hollows. A clearance of 0.80mm on the bolt of screw must be allowed.

Ridges, Valleys, Flashings

The ridges, valleys and flashing etc., shall be formed on No. 24 gauge pre-panted mild steel sheeting of a qualify to the sheeting on each side at 450mm centres maximum with 6mm diameter seam bolts 20mm long each wit one diamond shaped bitumen washer one pre-painted steel washer and one pre-painted steel nut.

Ridges and valleys shall not be less than 375mm girth.

Bolts and Screws

All fixing bolts and screws shall comply with B.S. 1494.

Square Abutments

At the square abutments the last tow corrugations of the corrugated iron sheets next to wall shall be flattened and turned up against wall and covered with 2-gauge pre-painted sheet iron apron flashing.

Bat Proofing

Bat proofing shall consist of "Perspex" or other equal and approved translucent plastic corrugated sheeting.

TILE ROOFING

Concrete Single-pin tiles and Fittings

Concrete singe-pin tiles and fittings shall comply to B.S. 473 and 550; Part 2 group B. Tiles are to be 381 x 229mm nominal unless otherwise specified.

Concrete Single-pin tiles and Fittings

Surface coating, when specified must be firmly bonded. A full range of fittings are available from the manufacturer and must match the tiles with which they are laid.

Mangalore Tiles

Mangalore tiles where specified, shall be interlocking clay tiles as manufactured by M/s Clayworks Ltd., or other equal and approved. They shall be uniform in size, shape and colour, hard, well burnt and free from defect.

They shall be laid in accordance with the manufacturer's printed instructions.

Polythene Underlay

Nails for underlay shall comply to B.S. 1202: Part I

Tying Wire

Tying wire shall comply to B.S. 443, 1.6mm diameter (16 S.W.G.) iron wire.

Decra Roofing Tiles.

Decra roofing tiles where specified, shall be interlocking steel tile with a coating as manufactured by Decra roofing tiles products. They shall conform in size, shape thickness and coating to the manufacturer's specifications and standards. They shall be laid in accordance with the manufacturer's printed installation details and instructions.

CARPENTRY

STANDARDS AND CODES OF PRACTICE

The requirements of the following British Standards and Codes of Practice shall be observed:

British Standards

a)	B.S. 565	Glossary of items relating to timber and wood work.
b)	B.S. 1860 Part 1	Structural timber. Measurements of characteristics affecting strength (softwood)
c)	B.S. 4471	Dimensions for softwood
d)	B.S. 373	Methods of testing small clear specimens of timber.

Standards And Codes Of Practice (Contd.)

e)	B.S. 1202 Part 1	Nails
f)	B.S. 1579	Connectors for timber.
g)	B.S. 4169	Glued laminated structural members.
h)	B.S. 916	Black bolts

Codes of Practice

a)	C.P. 112	The structural use of timber.
b)	C.P. 98	Preservative treatment for Construction timber.
c)	NOTE:	The contractor's attention is drawn to drawn to section 'L' of the Standard Method of Measurement.

DEFINITIONS

Selected

The term 'selected' shall be deemed to include keeping the materials so described clean for staining, polishing, or any similar finish.

Hardwood or the like

The term 'hardwood or the like' which is used as a statement to which ironmongery is to be fixed, shall be deemed to include plywood and other manufactured materials, except when faced with metal, laminated plastics or the like.

MATERIALS

Terminology

All technical terms shall be as defined in the Glossary of Terms used in Timber Standards, the British Standard Code of Practice No. 112.

Timber Generally

Timber shall be sound, well conditioned, properly, seasoned, containing of more than 15% moisture for joinery work or 18% moisture for carpentry work and complying with the following performance specifications.

Performance Specifications

The specifications refer to all conifer (softwood) and broad leaved (hardwood) species and apply to timber sections incorporated in the building after they have had a sufficient time to season. The period required for green timber to season fully after installation under cover shall be assumed to be one month for each 25mm thickness.

Unless noted elsewhere timber shall conform to the listed specification as follows:

a) F Grade	Furniture and high class joinery
b) GJ Grade	General Joinery
c) S75 Grade	Structural grade having grade stress value of 75% of basic Stress
d) S50 Grade	Structural grade having stress value of 50% of basic stress.
e) C Grade	A general construction grade for non-stressed construction.
f) L Grade	A low grade for low quality.

GENERAL

All timber used for carpentry shall be sound, well conditioned, properly seasoned to suit particular use and free from defects or combination of defects rendering it unsuitable for the purpose intended.

Timber used for carpentry shall be in accordance with the latest approved Grade Rules as may be directed by the Project Manager Timber used structurally shall be to the approval of the Project manager and shall comply with the requirements of the Export Grading Rules made under the Export of Timber Act, Second or Select Grade, as per B.S. 1860.

The following timber shall be used:

a) Cypress
b) Podocarpus (Podocarpus spp)
c) Cedar (Junipers Procera)
d) Elgon Olive
e) Mahogany

All timber as it arrives on site shall be inspected by the contractor and any timber found not to comply with the specifications or mot approved must be removed forthwith from the site and only timber which has been approved shall be used.

Tolerances shall conform with the following extracts from the Government of Kenya grading rules:

a) Softwood Grading strength grades first and second grades.

b) Undersize All timber to be sawn by 1.6mm per 25mm of thickness and width.

Not more than 3mm in thickness and not more than 6mm in width.

All timber shall be free of live borer, beetle or other insect attack when brought upon on site. The contractor shall be responsible, to the end of maintenance period, for executing at his own cost, all the work necessary to eradicate insect attack from timber attached or suspected to be attacked, not withstanding that the timber concerned must have already been inspected and passed as fit for use.

GENERAL

Timber shall be seasoned to moisture content of not more than 18%.

All carpentry timbers shall be treated with pressure impregnated "Celcure" or "Tenalith" solution with a minimum wet retention of 5.46kg of dry salt per m3. If so required 'charge sheets' issued after treatment with 'Celcure' or 'Tenalith' shall be submitted by the contractor to the Architect for his retention. All out ends and other cut faces or timbers sawn after treatment shall be treated before fixing with 'celcure 'B' or 'Wolmanol' solution brushed on.

The contractor's rates for such timber hereinafter must allow for the above treatment.

All grounds shall be podocarpus or other light and approved hardwood.

Nails shall comply with the relevant standard as above.

Black bolts shall comply with B.S. 916.

Rag bolts, coach screws and others shall comply with B.S. 1494.

Where used externally nails and screws shall be sherardized.

Timber shall be delivered early to the site, stored under cover clear of the ground and protected from the sun and dampness.

The Project Manager shall be given facilities and reserves the right for inspection of all works in progress whether in workshop or on site. The contractor is to allow for testing of pro-types of special of special construction units and Project Manager shall be at liberty to select any sample he may require for the purpose of testing i.e. for moisture content or identification, species, strength etc.

The contractor is to clear out and destroy or remove all cut ends, shavings and other wood waste from all parts of the building and the site generally, as the work proceeds and at conclusions of the work.

The clearance, destruction and removal is to prevent accidental borer infestation and to discourage termites and decay.

All carpentry work shall be accurately set out in strict accordance with the drawings and shall be framed together and securely fixed in the best possible manner with properly made joints. All brads, nails and screws etc., shall be provided as directed and approved and the rates shall be deemed to allow for these.

Carpentry work shall be left with sawn faces except where specified to be wrot.

All timber shall be as long as possible in length in order to minimize joints. If splitting is likely, or is encountered in the course of the work, holes for nails are to be prepared at diameters not exceeding $4/5^{th}$ of the diameter of the nails. Clenched nails must be bent at right angles to the grain.

Lead holes are to be bored for all screws. When the use of bolts is specified the holes are to be bored from both sides of the timber and are to be of the diameter D/16 where D is the diameter of the bolt. Nuts must be brought up tight but care must be taken to avoid crushing of the timber under washers.

JOINERY

STANDARD AND CODES OF PRACTICE

The requirements of the following British Standards and Codes of Practice shall be observed:

British standards

a) B.S 565	Glossary of terms relating to timber and Woodwork
b) B.S 4471	Dimensions for softwood
c) B.S. 1186	Parts 1+2 Quality of timber and workmanship in joinery
d) B.S 373	Methods of testing small clear specimen of timber
B.S. 4512	Methods of test for clear plywood.
f) B.S.1142 Part 3	Fibre building board (Insulation board softwood)
g) B.S 3444	Block board and laminated board
h) B.S 1455	Plywood manufactured from tropical hardwoods
i) B.S 3794	Decorative laminative board.
j) B.S. 549 Part 2	Flash doors.
k) B.S.459 Part 3	Fire check flash doors and wood and metal frame (1.5 hour and 1 hour types)
l) B.S. 1567	Wood door frames and linings.

m) B.S. 584	Wood trims (softwood architraves, skirtings, quadrants etc)
n) B.S. 1024	Synthetic resin adhesive
Part 1+2	(phenolic and type MR- Moisture
	amino plastics) for wood
	Resistant Type INT- Interior.
o) B.S 1210	Wood screws)
p) B.S 1494 Part 2	Fixing accessories for building purposes
	(bolts, screws, staples etc.)
q) B.S 4174	Felt tapping screws and metallic drive screws.

Code of Practice.

a) C.P. 201	Timber flooring
b) C.P. 201	Flooring for wood and wood products
Parts 1+2	
c) C.P.151	Doors and windows including
	Frames and linings
d) NOTE:	The contractors' attention is drawn
	to the Section "M" of the standard
	Method of Measurement.

DEFINITIONS.

Selected

The term 'selected' shall be deemed to include keeping the material so described clean for staining, polishing or any similar finish.

Hardwood or the like.

The 'hardwood or the like' which is used as a statement to which ironmongery is to be fixed, shall be deemed to include plywood and other manufactured materials except when faced with metal laminated plastics or the like.

MATERIALS.

Terminology.

All technical terms shall be defined in the glossary of Terms used in Timber Standards, the British Standard Code of Practice No. 112.

Timber Generally.

Timber shall be sound, well conditioned, properly seasoned, containing no more than 15% moisture for joinery work or 18% moisture for carpentry work, and complying with the following performance specification:-

Performance Specifications.

These specifications refer to all conifer (soft wood) and broad leaved (hardwood) species and apply to timber sections incorporated in the building after they have had a sufficient time to season. The period required for green timber to season fully after installed under cover shall be assumed to be one month for each 25mm. thickness.

Performance Specifications (Contd.)

Unless noted elsewhere timber shall conform to the listed specifications as follows:-

a) F Grade Furniture and high class joinery
b) Gj Grade General joinery
c) S75 Grade Structural grade having grade stress value of 75% of basic stress
d) S50 Grade Structural grade having stress grade value of 50% of basic stress
e) C Grade A general construction grade for non-stressed construction
f) L Grade A low grade for low quality work

Defects shall not exceed those specified in tables 1, 2 and 3 of 02-17.

WORKMANSHIP

The timber for joinery shall be as specified in the Export Timber Ordinance of 1951 and obtained from an approved sawmill. All such timber shall be Prime Grade and reasonably straight, grained and shall be purchased immediately the Contract is signed. It shall be open stacked on site for such further seasoning as may be required.

Timber which in the opinion of the Project Manager does not satisfy the specification in character or condition or is not suitable for the requirements of the work because of the blemishes it contains shall not be used.

The following timber shall be used;-

a) Podocarpus 068
b) Mvuli
c) Cedar
d) Elgon Olive
e) Elgon Teak
f) Camphor
g) Mahogany

All timber shall be wrot by machine dressings. Non- exposed faces and machine marks shall be removed with hand plane and sanded out, unless otherwise specified.

The dimensions and thickness stated in the Bills Quantities are the finished (unless otherwise stated) and the Contractor will allow for the necessary waste.

The joinery shall be worked strictly in accordance with Drawings, and is to be framed up and put together as soon as possible and stored in the drying rooms, for as long as possible before being wedged up. All joints and angles are to glued and where

necessary cross tongued with hardwood tongues and surfaces finished clean and smooth, with machine marks and sand- papered out before fixing.

Should any of the joinery work shrink, warp, wind, or defect unduly before the end of the maintenance period of the Contract, the work is to be taken down and rectified at the Contractor's sole expense.

Tolerance in thickness shall conform with the following extracts from the Government of Kenya Rules: -

Hardwood Grading: (first and second grades)

a) 1.6mm oversize on pieces up to 22mm in thickness.
b) 3mm over size on pieces over 25mm and up to 51mm in thickness.
c) 6mm over size on pieces over 51mm in thickness, under size will not be permitted.
d) Softwood grading Appearance Grades (First and Second Grades); under size will not be allowed.
e) Oversize: All timber to be sawn oversize by 1.6mm per 25mm of thickness and width. Not more than 3mm in thickness and not more than 6mm in seasoning of timber shall be to a moisture content of not more than 15%.

Pressure impregnation treatment shall be as for "Carpentry".

Where joinery is described as screwed, this is deemed to include sinking the head of the screw and pellating with similar timber, and to grain I with the finished joinery.

All hardwood joinery shall be finished for oil paint/varnish, unless otherwise stated. The rates shall be deemed to allow for all nails and screws and fixing, all labour, cuttings notching, halving, morticing, tenoning and wedges except where otherwise stated.

All works described as plugged shall be fixed with screws to plug formed by drilling concrete wall etc., with the proper tool of suitable size and 750mm. spacing and filling the holes completely with "Phil plug" raw plastic or raw plugs in accordance with the manufacture's instructions. Alternatively and where so agreed by the Project Manager, hardwood dovetailed fixing slips in preservation and cut and primed or bedded in cement mortar (1:3) may be used.

The rates are to allow for all surfaces of joinery where in contact with walling or plaster, or where otherwise unexpected being treated before fixing with two coats of approved wood preservative.

Laminated plastic sheeting shall be "formica" manufactured by M/s Thomas de la Rue and Co., or equal and approved, 1.6mm thick and accurately fixed with approved type waterproof impact adhesive and in the colours selected by the Project Manager.

Blockboard shall comply with the Standard as mentioned above.

Plywood shall comply with the standard as mentioned above and faced both sides unless otherwise stated.

Fibreboard shall be 12.7 “Celotex” or other equal approved softboard.

All joinery work shall be accurately set out and framed together as soon after commencement of the building as in practicable bit not to be wedged up or glued until the building is ready for fixing same. Any portions that warp, wind or dent shall be removed and new ones fixed in their place together with other work which may be affected thereby or at the Contractors expense.

All work shall be properly mortised, tennoned, housed, shouldered, dovetailed, notched, primed, braded etc., as directed and to the satisfaction of the Project Manager and all glued up with the best quality glue.

Joints and joinery shall be specified or detailed, and so designed and secured as to resist or compensate for any stresses to which they may be subjected. All nails strings, etc., are to be punched and putted. Loose joints are to be where provisions for shrinkage is necessary; glued joints where shrinkage need not be considered and conditions may be damp must be of the resin type. For non-load- bearing joints or where dry conditions may be guaranteed, resin or organic glues may be used.

All exposed surfaces for joinery shall be wrot and all rises “cased off” by planning and sand papered to an approved finish suitable to the specified treatment.

3 mm reduction of specified surfaces will be allowed to each wrot face except in members 25mm. Thick or less or where described as finished sizes in which case joinery shall hold up the full dimensions.

In fixing all beads, fillets and small members shall be fixed with round or oval brads or nails well punched in and stopped. All large members shall be fixed with screws. Brass screws shall be used for fixing of all hardwoods, to the heads in and pellated with wood pallets to match the grain.

Rates shall include for bedding frames, cills, etc, in mortar or dressing surfaces of walls, etc, in lieu.

Round wood plugs shall not be used, and screws or plugs shall be spaced at 75mm. Centers.

All fixed joinery which in the opinion of the Project Manager is liable to become bruised or damaged in any way shall be completely cased and protected by the contractor at his own expense until completion of works.

Bottom edges of doors shall be painted or polished with two coats of approved primer before fixing.

ALUMINIUM WORKS

STANDARDS AND DIRECTIVES

All aluminium works are to be executed according to the valid standards, directives, government calls and building regulations, fire regulations and any other such application, regulations such as:-

a) DIN 107 Methods of testing windows; mechanical tests

b) DIN 1055 Design loads for buildings

c) DIN 1240 Flat glass for building construction

d) DIN 1745 Wrought aluminium alloy plates, sheet and strips greater than 0.35mm. thickness; conditions properties, technical delivery

e)DIN 1748 Wrought aluminium and aluminium extruded sections; design, Permissible deviations.

f) DIN 1783 alloys Strips, planes and sheet of aluminium and wrought aluminium with thickness of over 0.335mm, cold rolled; dimensions.

g) DIN4102 Fibre behavior of building materials and building components.

h) DIN 4108 Heat insulation in buildings.

i) DIN4109 Noise control in buildings

j) DIN 4113 static Aluminium constructions under predominantly static loading, analysis and structural design.

k) DIN7863 Non-cellular elastomer glazing and panel gaskets

l) DIN 16935 Sheets of polysobutylene used for damp proofing

m) DIN 17611 alloys with Anodized wrought products of aluminium and aluminium layered thickness.

n) DIN17615 AlmgSi 0.5 precision profiles.

o) DIN 18000 Modular co-ordinations in building

p) DIN 18055 Windows; air permeability joints, water tightness and mechanical strain.

q) DIN 18056 Window walls; design construction

r) DIN 18103 (Burglar resistant) doors

s) DIN 18201 Tolerances in building; terminology, principals, application, verification.

t) DIN18202 Dimension tolerance; in building construction

a) DIN18203 Dimension tolerance; precast/reinforced/prestressed concrete.

b) DIN 18355 Contract procedure for building works; general technical specification for steel construction works

c) DIN 18357 Contract procedure for mounting aluminium fittings.

d) DIN 18358 Contract procedures for rolling shutter works

e) DIN 18360 Contract procedures for locksmith works

f) DIN 18361 Contract procedures for works for protection against corrosion of steel and aluminium structures

g) DIN 18540 Sealing of exterior wall joints in building construction using joint sealants

h) DIN 18801 Sealing of exterior wall joints in building construction using joint sealants

i) DIN 18808 Steel structures consisting of hollow section predominantly static loaded.

j) DIN 555920 Protection of steel structures from corrosion by organic and metallic coatings.

k) VD 2719 Sound insulation of windows or comparable British codes and standards

l) CP 3 codes of basic date for the design of building

m) CP 118 the structural use of aluminium

n) CP 158 windows and roof lighting

o) DD 22 tolerance and fit for building

p) DS 1470 wrought aluminium and aluminium alloys for general engineering purposes, plate, sheet and strip

q) BS 1474 wrought aluminium and aluminium alloys for general engineering purposes, bars, extruded round tubes and sections

r) BS 3987 specification for anodic oxide coatings on wrought aluminium for external architectural application

s) BS4873 Aluminium alloy windows, specification

t) BS5950 structural use of steel bar in building

u) BS 6262 code of practice for glazing for buildings

v) BS 6375 performance of windows

w) BS 6496 specification for external architectural purposes, etc.

x) NOTE: The directives and guidelines on insulating glass Suppliers

The guidelines of accident insurers for local authorities

The guidelines of window/façade system manufacture

ALUMINIUM

Extruded aluminium profile of alloy AlMgsi 0.5F22 in anode quality according to DIN 1748 and DIN 176615 are to used, for anodized sheets AlMgl, for colour coated AlMgl or A199.5

a) special anodizing processes to be taken into account , if determined by the Bill of Quantities

b) the aluminium system shall be capable of achieving different colours and finishes on the external/internal façade and within the same element

STEEL

Steel parts for anchoring or braising must either be non- corrosive or galvanised. During mounting all necessary welding points have to be painted with cold Zinc galvanizing.

SECTION OF PROFILES

All required sections are to be chosen according to foreseen application and data given by the system manufacturer. Thermally insulated out and inner profiles must be continuously connected and sheer-resistant by insulating bars.

The profiles must safely support all loads as described in DIN 1055. The effective moments of inertia given by the system manufacturer are to be considered when selecting the optimal profile. The principal of thermal is to be respected in all points of construction. All thermally insulated profiles are determined by the Groups of DIN4108.

Ventilation and drainage of rebate base and from chamber must be foreseen in the aluminium construction system in order to drain off moisture to the outside. The insulating connection of outer and inner sections must be water-proof and water-resistant without additional sealing if the connection uses the rebate or front chamber. When using insulting glass the ventilation of the rebate base is to be guaranteed as the insulating glass suppliers specified.

a) All aluminium and maximum vent sizes and weights as listed in all B.S. profile system or binding

b) The glazing guidelines of the insulating glass supplier and DIN18056 determining the allowed deflection of mullions and transoms are to be observed.

PROFILE CONNECTIONS

Corner cleats must have a cross section which corresponds to the interior profile contours. At the mitres a perfect sealing and gluing is required. In T- joints the seeping of water into the construction must be prevented by corresponding parking and elastic sealing.

VENT GASKETS

All gaskets are to be inserted in order to fulfill the specific window requirements (type, building height, etc) permanently the gaskets are to be exchangeable.

a) side hung, turn-tilt, bottom hung and double vent windows must have a middle gasket.

WINDOW LOADING

The system shall be so designed to suffer no permanent distortion or other damage. Deflection of larger pane edges are not to exceed 1/250 for double glazed units and 1/200 for single glazing. When subjected to positive and negative pressures as determined by an in accordance with B.SCP 3 Chapter 5 part 2.

THERMAL IMPROVEMENT.

The aluminum framework and glazing assembles shall be constructed and installed in the prepared locations with sufficient tolerance and, where necessary, expansion joints incorporated within the coupling, to provide for expansion and contraction as will be caused by the climatic conditions and temperature changes, winter summer, day to night, without buckling, distortion of joints, damage to sealants or other detrimental effects over the temperature range-15 deg. C. to 35 deg. C. The design shall accommodate, noiselessly, the thermal movement within the combination units and the curtain walling without distortion. Details shall be prepared based upon the dimension at 20 deg. C. and take account of the ambient temperatures at the time of assembly and installation.

DRAINAGE AND VENTILATION OF CONSTRUCTION

All profile rebates where water or condensate could seep in are to be drained off and ventilated by wind-protected slots or through cavities to the outside.

The system shall incorporate an integral and internal condensate collection drainage channel to remove the condensate from within the assembly to the external drainage system.

Provision for the continuity of drainage for the transome to the mullion is to be provided.

No perforation of the internal structural members within areas of drainage will be permitted.

All internal section junctions are to be adequately sealed.

Transome members within sloped glazed areas shall permit water to drain from one area to another without inhibiting the flow and creating pooling.

FITTING

a) Construction systems of VS are to be assembled or completed by compatible system fittings as specified. Other fittings may be selected but only if fulfilling DIN standards. If not specified in the Bill of Quantities, all fittings except handles and hinges are to be concealed.

b) The fittings are to be attached in their rebates tension and pressure proof. If required because of profile wall thickness screw connections need nuts and washes.

GLAZING PANES

Glass supply and glazing is described separately for each positions of the Bill of Quantities.

a) The glazing is to be executed by permanent elastic EPDM-gasket.
b) Guidelines and directives of insulating glass suppliers are to be strictly followed.
c) Supply and installation for fixed panels is always described in the position concerned.

d) All glass assembles shall be tape sealed between the units and within the structural unit zone and prior to the installation of the external gasket and pressure plate.

BUILDING DIMENSIONS.

The exact measurement must be produced by the tenderer himself on site.

a) If the client required the construction to be ready for mounting before the measurement on site can be carried out, the tenderer shall determine the assembly dimension together with the client taking into account the tolerance of the building according to DIN.

WORKING DRAWINGS.

After award of contract, the contractor must submit working drawings for specific positions and details as requested by the project manager.

INSTALLATION OF ELEMENTS.

The anchoring of all aluminium elements must neutralize all movements of structure and elements attracted without loading or stress the aluminium construction.

a) All mounting of aluminium elements is to be executed exactly in horizontal and vertical alignment according to the measurement points provided by the client.

b) All attachment accessories necessary for mounting are to be calculated by the tenderer.

c) If described in the Bills of Quantities, some anchor rails for attachments will be provided or will be fixed to the structure. In this case, the contractor is requested to provide a location plan of required anchoring in time.

All connecting means, e.g. screws or bolts, must be non-corrosive zinc plated steel.

All attachments to neighbouring building parts are to be considered when calculating the positions in the Bills of Quantities.

GASKETRY AND SEALING

Appropriate EPDM- gaskets or seals are to be inserted according to design, dimensions and its range of application. The gaskets or seals and their elasticity must fulfill all temperature requirements. The contractor shall ensure total alignment of the gasketry in all visible locations.

a) Permanent elastic sealing compounds on silicons or thiocol bases are to be applied for sealings. Joints within any area of the system are to be adequately bolded together to produce a water tight joint. The sealing must stick to the construction parts taking into account the shape of elements and the range of existing temperature without loosening when elements move caused by tension to be considered before. All guidelines of sealing compound suppliers are to be respected.

ANODIC OXIDATION.

The aluminium profiles and sheets are to be anodized according to DIN 17611. Surface treatment coating and protection is determined by the specifications as described in the Bills of Quantities.

a) After the Contract, the tone of colour is to be defined according to colour samples.

b) All visible fittings must suit the profile colour if available.

IRONMONGERY

STANDARDS AND CODES OF PRACTICE.

The requirements of the following British standards shall be observed:-

British Standards.

a) B.S 1227 Part 1 A	Hinges
b) B.S.2088	Performances state for locks
c) B.S. 2911	Letter plates
d) B.S. 4112	Performance requirements for hardware domestic furniture.
e) NOTE:	The contractors attention is drawn to Section "M" of the Standard Method of Measurement.

MATERIALS AND WORKMANSHIP.

All locks and ironmongery shall be fixed with screws etc, to match, before woodwork is painted, handles shall be removed, carefully stored and re-fixed after completion of painting and locks oiled and left in perfect wording order.

All keys shall be labelled with the door reference on labels before handing to the Project Manager on completion. All ironmongery shall be carefully protected until completion of the work and any damage is to be made good at the contractor's expense.

Rates shall allow for easing and adjusting all doors, etc, and for lubricating all locks, hinges, etc, and left in perfect working order.

Where description fixing ironmongery includes catalogue numbers, such items shall be obtained from the specified manufacturers if at all possible.

Rates shall include for labeling all keys with door references as directed by the Project Manager.

METAL WORK

STANDARDS AND CODES FOR PRACTICE.

The requirements for the following British Standards and Codes of Practice shall be observed.

British

a) B.S.4 Part 1	Structural steel, Hot rolled screws
b) B.S. 4 Part 2	Structural steel, Hot rolled hollow sections
c) B.S.325	Black cup and countersunk bolts and nuts.

STANDARDS AND CODES FOR PRACTICE.

d) B.S. 916	Black bolts, screws and nuts.
e) B.S. 4174	Self tapping screws and metallic drive screws
f) B.S. 405	Metal washers for general engineering purposes.
g) 1161	and addendum Aluminium and aluminium alloy sections for general engineering purposes.
h) B.S 938	Metal ore welding or structural steel tubes.
i) B.S 1856	Metal ore welding or mild steel
j) B.S.729 Part 1	Hot dip galvanized coating iron and steel articles
k) B.S 1474	Wrot aluminium and aluminium alloy
l) B.S 990 Part 1+2	Steel windows (Domestic and similar buildings.)

Codes of practice.

a) C.P. 499	Metallic railing and balustrades
b) C.P. 117	Composite construction in structural steel and concrete
c) C.P. 2008	Protection of iron and steel structures from corrosion.
d) C.P.3012	Cleaning and preparation of metal surfaces
e) NOTE:	The Contractors attention is drawn to section “P” of the Standard Method of Measurement.

MATERIAL AND WORKMANSHIP

Iron and steel where galvanized shall comply with the requirements of B.S. 729, part 1 entirely with fine fabrication by complete immersion in zinc bath in one operation and all excess carefully removed.

The finished surfaces shall be clean and uniform. All works in aluminium shall comply with the standards mentioned above.

All smiting and bending shall be soundly and nearly executed care being taken not to overheat.

All strap bolts and similar works shall be forged neat and cleaned from the anvil.

All welded connections shall be ground to a smooth finish and rates shall be deemed to allow for this.

Steel windows shall comply with the requirements of the standard mentioned above and shall be fixed in accordance with manufacturer's instructions.

All mild steel except galvanized shall be cleaned of rust and scale, painted one coat red lead priming paint before delivering to site and the rates shall include for this.

FLOOR WALL AND CEILING FINISHES

STANDARD AND CODES FOR PRACTICE.

The requirements of the following British Standard and Codes of Practice shall be observed: -

British Standards

a) B.S.1191 Part 1	Gypsum building plaster (excluding premixed light weights plasters.)
b) B.S. 1193	Standard for internal plastering with gypsum plasters.
c) B.S.1100 Table 1	Sands for external rendering, internal plastering with lime and Portland Cement, and floor screeds
d) B.S. 1201	Aggregate for granolithic floor finishes.
e) B.S. 1281	Glazed ceramic tiles and tile fittings for internal walls
f) B.S. 1369	Metal lathing (steel for plastering)
g) B.S. 890 Class A	Building limes
h) B.S. 1187	Woods Block for floor
i) NOTE:	The Contractor's attention is drawn to Section "S" of the Standard Method of Measurement

MATERIAL AND WORKMANSHIP.

Cement

Cement shall be described in “Concrete”

Sand

Sand shall comply with the requirements of the standard mentioned earlier.

Lime

Lime shall be non-hydraulic lime to satisfy the Standards mentioned above. It shall be obtained from an approved source.

It must be freshly burnt and shall be slaked at least once a month before using by drenching with water, well broken up and mixed and the wet mixture shall be passed through a sieve of 10 mashes to the square centimeter. Lime putty shall consist of freshly slaked lime as described above, saturated with water until semi-fluid and passed through the fine sieve, it shall then be allowed to stand until superfluous water has evaporated and it has become consistency of thick paste, in no case for shorter period of one month before being used during which it must be kept dump and clean and no portion of it allowed to become dry.

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

Concrete Beds of Slabs.

All concrete beds and slabs shall be thoroughly brushed, hatched if necessary and well wetted and flashed over with a cement and sand (1 grout immediately before screeds or paving are laid.)

Screeds and cement paving shall be laid in accordance with the relevant British Standards and/or Codes of Practice and in alternative bays generally not exceeding 3.0m during any period of working hours with neat butt joints and shall be damp cured with sand and sawdust and kept damp for at least 7 days after laying.

As bays are formed batten strips must be used to retain the exposed edge of the screed.

Thickness and mixes of screeds are adjusted to suit the various top dressing and the Contractor must first ascertain what finish is intended to each specific area before the work of laying screeds in put in hand.

Screeds shall be finished with a wood float for wood blocks and steel trowel for thermoplastic and similar tiles.

Surface to be Plastered

All surfaces to be plastered must be brushed clean and well wetted before plaster is applied. Joint of walling shall be raked and concrete hacked to form a key. Care shall be taken to see that paving and plastering do not dry out prematurely. Adequate time intervals must be left between successive coats in two coat work in order that the drying shrinkage of the undercoat may be substantially complete.

Internal Lime Plaster

To be applied in minimum two coats to finish not less than 12mm total thickness. The rendering coat shall be in the protection of cement and sand (1:4) and the finishing coat not less than 1.50mm thick shall consist of fine sieved lime putty with 10% of cement thoroughly incorporated immediately before use, trowelled hard and smooth with a steel trowel and sprinkled with water during the process.

The first coat shall be well soaked to form a key and at least fourteen days must elapse between the completion of any portion of the rendering coat and application of the finishing coat.

Marmoran Aztec 3-1

This applies to concrete, plaster renders, fibre cement and gypsum substrates only- for other substrates consult a Marmoran Technical Advisor or refer to the table in 'Preparation of substrates'. A primer may be required if the substrate is of porous or previously painted, or if there is a distinct colour difference between the Marmoran Aztec 3-1 and the surface to be coated.

New Work; Prepare substrate by removing all loose and friable particles. Stop and fill appropriately. Ensure that the surface is clean, dry and sound in accordance to SABS ISO 1514; 1993(South Africa Market only). Apply the 2 coats of Marmoran Aztec 3-1 with a stippled or lambs wool roller, depending on the desired texture. Allow for drying time between coats.

The system must be applied in strict conformance to other manufacturer's instructions.

Redecoration; Prepare by removing all loose and flaking paint, dirt, grease and grime. Spot prime exposed substrates appropriately. Proceed as for new work.

External Cement and Sand Rendering

External cement and sand rendering shall consist of cement and sand (1:4) applied in two cats and finished with wood float

Samples

If required the Contractor shall prepare samples of the screeds, pavings and plastering as directed until the quality, texture and finish required is obtained and approved by the Project Manager, after which all work executed shall conform with the respective approved samples.

Marmoran Caledonplast 2-1

This is a decorative plaster in a combined plaster and topcoat and may be applied at a coating thickness of 1 mm. The use of a primer such as Marmoran Universal Primer is recommended where the substrate is porous or dense or LP or RBP Acrylic primer on previously painted surface, or where the is a distinct colour difference between the Marmoran Caledonplst 2-1 and the surface to be coated.

Marmora Caledonplast 2-1 is applied using a steel trowel and floated with a plastic trowel to give the finished effect. Marmoran Caledonplast 2-1 is supplied Ready for use .Do not thin .

The coating should never be applied during adverse weather conditions, or on wet surfaces. In hot climates, the coating should be applied during the morning and late afternoon hours, and if possible away from direct sunlight.

Specification; This applies to concrete, plaster renders, fibre cement and gypsum substrates only- for other substrates consult a Marmoran Technical Advisor or refer to the table in 'Preparation of substrates'. New Work; Prepare substrate by removing all loose and friable particles. Stop and fill appropriately. Ensure that the surface is clean, dry and sound in accordance to SABS ISO 1514; 1993(South Africa Market only).Prime the surface with the appropriate Marmoran Primer. Apply the Marmoran Caledonplast 2-1 by using a steel trowel to achieve the desired patterned finish. Redecoration; Prepare by removing all loose and flaking paint, dirt, grease and grime. Spot prime exposed substrates appropriately. Proceed as for new work.

Screeds and pavings

All screeds and pavings shall be finished smooth, even and truly level, unless otherwise specified and paving shall be steel trowelled.

Finishing

Rendering and plastering shall be finished plump, square, smooth, hard and even and junctions between surfaces shall be perfectly true straight and square.

All work not found to be of satisfactory standard shall be hacked away and made good at the Contractor's expense.

Partially or wholly set materials will not be allowed to be used or re-mixed. The plaster etc., mixes must be used within two hours of being combined with water.

Granolith paving

Granolithic topping is to be in two layers to the total thickness shown on the Drawings and topping shall consist of one part coloured cement to two parts aggregate shall be 70% black trap and reminder approved local coloured stones.

Colours shall be as selected by the Project Manager.

Paving shall be rolled and trowelled to a dense even surface and rubbed down at completion to a grit finished surface free from holes and blemishes. The paving shall be laid in square divided by plastic strips anchored securely in the screed and having

their top edge truly with the finished floor surface. The granolithic work shall be laid polished complete to the approval of the Project Manager.

Wood Block flooring.

Wood block flooring shall comply with the requirements of B.S 1187 mentioned above and shall be dripped in a cold latex bitumen emulsion adhesive before laying.

Any one package or bundle shall contain wood blocks of single species, thickness, width length and type of manufacture only. The pattern shall be approved by the Project Manager.

Wood parquet flooring shall comply with relevant standards and shall be laid using and approved adhesive in accordance with manufacture's instructions.

P .V.C. Covering

P.V.C. coverings shall satisfy the Standard mentioned and shall be obtained from an approved manufacture's agent. Floor tiles shall be Dunlop or other equal and approved. Rates shall include for two of an approved emulsion floor polish or other protective coating

Glazed Wall Tiles

Glazed wall tiles shall be cushion edged and satisfy the relevant Standards as mentioned earlier. Tiles shall be well soaked in water laid with straight horizontal and vertical joints painted in white cement and cleared down at completion.

Tiles joints of 2mm width shall be formed and filled with the redding mix but using very fine, well screened, care shall be taken that tiles are not overstocked and water shall be avoided during fixing.

The fixed tiles shall be kept damp for 4 days. Tiles are splash backs to lavatory basins, sinks and baths shall be fixed with necessary rounded-edge corner tiles.

Rates for linear items shall allow for all special fittings and cutting at angles and intersections.

General

Rates for in-situ work shall allow for raking out joints walling or hacking or treating with an approved bonding fluid. Hacking concrete form key, dubbing out irregular surfaces of base to provide a finished surface to in the same plane as the surrounding surface, cutting out cracks, making good and leaving the whole of the work sound and perfect on completion.

Rates shall also allow for fair edges, whether square, splayed or rounded, arises, chamfered external angles not exceeding 25mm wide, rounded external angles not exceeding 25mm radius coved internal angles not

exceeding 25mm radius, intersections to groins and the like, and for making good around pipe, brackets, floor spring boxes and all other items of a like nature.

Rates for all linear items shall allow for all short length, angles, end and arises, mitres and intersections and the like.

Rates for all paving shall allow for adequate covering protection during the progress of the work to ensure that the floors are handed over in perfect condition on completion.

Rates of external rendering shall allow for work at any height and for any scaffolding, ladders, cradles etc. required.

Terrazzo pavings

Aggregate for terrazzo shall be good quality marble or other natural stone of similar characteristics, hard angular in shape, free from clay, iron oxide and other foreign matter, graded from 10mm to 6mm. unless otherwise specified and without excessive contents of fine and dust. The source of supply and colour are to be approved by the Project Manager before bulk ordering.

Terrazzo flooring must be laid and finished by an approved specialist sub-contractor. All

base surfaces must be thoroughly cleaned to remove dust, dirt, rust, oil and loose material.

Terrazzo shall be laid in two courses as follows:-

a) Base Course: cement –sand 1:3, not less than 20mm. thick, followed immediately by
b) Topping terrazzo mix as specified, not less than 20mm. finished thickness
c) Skirtings are to be 6mm. thick on a screed not less than 10mm. thick.

Terrazzo bays shall not be more than 1M2 and joints shall be formed with plastic or aluminium strips set out to an approved pattern. Strips must be through the backings screed and finish flush with the floor surface.

Tamp lightly immediately after laying and compaction lightly, taking care to avoid excessive laitance on the surface. Not less than 3 days after laying, rough polish by an approved mechanical means using water. Grout with a fine mix reserved from the initial mix. Not less than 8 days after grouting, fine polish by an approved mechanical means using water to a texture approved by the Project Manager.

Terrazzo Floor Tiles

Terrazzo floor tiles shall be to B.S 4131 of approved manufacture. The faces of tiles must be free from projections, depressions, flakes and crazes. The overall colour must be practically uniform in any one delivery. The facing level must not be less than 6mm. thick after grinding.

Unless otherwise specified or approved by the Project Manager, tiles are to be 197mm x 197mm x 22mm.

Mosaic finishes shall comply with the requirements of B.S Code of Practice C.P. 212 part 2.

Quarry Tile Finishes

Quarry tile finishes shall comply with the requirements of B.S 1286.

GLAZING

STANDARDS AND CODES OF PRACTICE

The requirements of the following British Standards and Codes of Practice shall be observed:-

British Standards

a) B.S 952	Glass for glazing
b) B.S. 544	linseed oil putty for use in wooden frames
c) NOTE:	The Contractor's attention is drawn to section "T" of the Standard Method of Measurement

Codes of practice

d) C.P 152	glazing and fixing glass for buildings

MATERIALS AND WORKMANSHIP

The whole of the glass shall be of the best quality and free from bubbles, specks, waves flaws or any other defects and shall comply with the requirements of the standards mentioned above.

All glass is to accurately cut to fit easily into rebates. Glass shall be well puttied and sprigged with copper springs.

Glazing to wood frames shall be secured with glazing beads fixed with grass caps and screws and wash leather or approved "Neoprene" beading strips. Putty for lazing in wood frames shall be composed of pure linseed oil and powdered whiting, free from grittiness all in accordance with the standard mentioned above.

Glazing to metal frames shall be quick hard setting tropical putty specially manufactured for use with steel windows.

Rebates of metal frames receiving glass shall be prepared and treated with primer for putty prior to glazing shall be primed 10 days after glazing.

Rates for glazing Georgian wired glass shall include for aligning lines in adjoining panes both ways.

Glass panes shall be cut to sizes to fit the opening with not more than 1.6mm play all round. Clear sheet shall be ordinary glazing (0Q) quality and polished plate shall be (GG) quality.

Mirrors to be of selected glazing (S.G.) quality plates glass of approved manufacture with bevelled edge fixed at all corners of walls with raw plugs and brass screws with removable chromium plated dome heads.

Cut out all cracked or broken glass re-glazed to match and leave perfect on completion. On one account shall windows be cleaned by scraping with glass.

PAINTING AND DECORATING

STANDARD AND CODES OF PRACTICE

The requirements of the following British Standards and Codes of Practice on completion shall be observed:-

British Standards

a) B.S. 2521 + 2523	Lead based joint
b) B.S. 3968	Calcium plumbate priming paints
c) B.S. 4756	Ready mixed aluminium priming paints for woodworks
d) B.S. 1336	Knotting
e) B.S 3842	Treatment of plywood with preservative
f) B.S. 4800	Paint colours for building purposes
g) B.S. 2524	Red-Oxide Linseed oil priming paint
h) B.S. 2525-7	Undercoating and finishing paints
i) B.S. 1215	Oil Stains
j) NOTE:	The Contractor's attention is drawn to section "U" of the Standard Method of Measurements

Codes of Practice

k) C.P. 231	Paints for buildings
l) C.P. 3012	Cleaning and preparation of metal surfaces.

GENERAL

All work under this trade must be executed by an approved Specialist unless otherwise permitted.

The Contractor's Programme in this area shall be so arranged that all other trades are completed and away from the area to be painted prior to the commencement of painting.

Before painting the Contractor must remove all concrete and mortar droppings and the like from all work to be decorated and remove all strains from and obtain uniform colour to be oiled and polished.

MATERIALS AND WORKMANSHIP

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

All painting and decorating schemes shall be carried out in colours selected by the Project Manager.

Paints shall be ready mixed, oil based priming paint shall comply with the requirements of the relevant standards mentioned earlier.

The oil shall comply with the requirements of B.S. 1215. All materials shall be of the best quality and shall be an approved proprietary brand selected from the latest scheduled paints.

Materials to be applied externally shall be of external quality and/or recommended by the manufactures for external use.

Materials shall be delivered to the site intact in the original sealed drums or tins and shall be mixed and applied strictly in accordance with the manufacture's instructions and to the approval of the Project Manager.

Unless specifically instructed or approved by the Project Manager, no paints, distemper etc are to be thinned or otherwise adulterated, but are to be used as supplied by the manufactures and direct from the tins.

If required by the Project Manager the Contractor shall provide at his own expense samples of paints etc., with containers and cases to be forward, carriage paid, by the Contractor for analysis to a laboratory.

The priming, undercoat and finishing coats shall be each be different tints, and the priming and undercoat shall be the correct brands and tints to suit the respective finishing coats, in accordance with the manufacture's instructions. All finished coats shall be of colours and tints selected by the Project Manager. Each coat must be approved by the Project Manager before the next coat is applied.

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

Colour cards of all paints etc. shall be submitted to and samples prepared for approval of the Project Manager before laying on, and such samples, when approved, shall become the Standard for the works.

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

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

Woodwork to be painted shall be rubbed down and all knots and resin pockets shall be scorched back and coated with knotting. After priming all nail holes and other imperfections shall be stopped and the whole

surface be rubbed down and all dust brushed off. The surface of woodwork shall be lightly sand prepared between the coats.

All woodwork in contact with walling or plaster shall be treated after cutting and preparation but before fixing assembly or fixing with one coat of approved wood preservative. The solution is to be brushed on all surfaces of all timbers, unless exposed to view and painted. The Contractor shall note that this solution is poisonous and shall take necessary precautions and instruct his workmen accordingly.

Wax polish shall be furniture polish of an approved branch, and wood surfaces shall be clean smooth free from oil or grease or any other blemishes. A minimum of two coats shall be applied to approval.

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

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

Fibre board or similar surfaces shall be lightly brushed down to remove dirt, dust and loose particles and have all nail holes or other defects stopped with an approved plaster compound stopping rubbed down flush and left with a texture to match surrounding materials and shall receive one coat petrifying liquid at last or two coats polyurethane or clear lacquer.

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

Hot primed and unprimed surfaces shall be given one coat of metal chromate primer.

Galvanized surfaces shall be treated before painting with an approved proprietary or de-greased solution before priming.

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

Existing painted and decorated surfaces shall be prepared as described above. Painted plaster, metal or wood surfaces shall then be rubbed down to expose the material beneath and paint burnt off with blow torches if necessary in the Project Manager's opinion.

Emulsion paint on ceilings and all undercoats of emulsions paint and complete oil painting on walls only if and as recommended by the manufacture. An approved plaster primer tinted to match may be submitted for the first coat.

Enamel paint shall be applied in two undercoats and one finishing coat after preparation and commenced and shall be cleaned and renovated if necessary and re-fixed after completion of printing.

Rates of painting shall be deemed to include for preparing and priming surfaces above described.

Rates for paints, distemper etc, shall allow for covering up all floors, fittings etc. with dust sheets when executing the work and for removing, covering when no longer required and floor cleaning, off, touching up and leaving perfect at completion.

DRAINAGE

STANDARDS AND CODES OF PRACTICE

The requirements of the following British Standards and Codes of Practice shall be observed.

British standards

a)	B.S. 556 part 1 + 2	Concrete cylindrical pipes and fittings (including manholes, inspection chambers and street gullies)
b)	B.S. 4101	Concrete un-reinforced tubes and fittings (with ogee joints for surface water drainage)
c)	B.S. 437 Part 1	Cast iron spigot and socket drain pipes and fittings
d)	B.S 1247	Manhole step iron (in malleable cast iron)
e)	B.S 2760	Pitch-impregnated fibre drainage pipes and fittings
f)	B.S 1211	centrifugally cast (spun) iron pressure pipes for water, gas and sewerage
g)	B.S. 1130	Cast iron drain fittings.
h)	NOTE	The contractor's attention is drawn to Section "V" of the Standard Method of Measurement.

Codes of Practice.

i)	C.P. 301	Building drainage
j)	C.P 2005	Sewerage
k)	C.P. 2010	Pipelines

PIPEWORK AND FITTINGS

Plastic Pipes.

The pipework and fittings for use underground shall be u PVC to B.S. 4660

Cast Iron pipework

Cast iron pipework which is used in connection with buried external services shall be manufactured, coated and tested in accordance with the requirement of B.S 1211.

All buried cast iron bends, elbows sweep tees and other fittings, shall comply with the requirements of B.S. 1130.

Jointing on external cast iron pipe shall be carried out in accordance with one of the methods described in British Standards Code of Practice 301, clause 505 c(v), to the approval of the Project manager.

Pitch Fibre Pipework.

Pitch fibre pipework and fittings for use in connection with external drainage services shall be manufactured in accordance with the requirements of B.S 2760. Pipes shall be connected by means of purposes made tapered joints manufactured in accordance with B.S. 2760.

Until such times as the use of pitch impregnated fibre is covered by Code of Practice, the jointing , laying and cutting of these pipes shall be carried out in accordance with the requirements of notes under appendix C of B.S. 2760.

Concrete pipework

Where concrete pipes and fittings are used in connection with the conveyance of surface water and sewerage under atmospheric pressure, they shall be manufactured in accordance with the requirements of B.S. 556, Class 1, except where otherwise stated.

The joints of concrete pipe and fittings may be one of the following depending upon application and conditions:-

1. Flexible spigot and socket type
2. Flexible rebated type (storm water drainage only)
3. Ordinary spigot and socket type
4. Ordinary rebated type (Storm water drainage only)

Joints (1) and (2) shall be sealed with suitable rubber gaskets manufactured in accordance with B.S/ 2494 except where they are likely to be contaminated by oil products, in which case the gaskets shall be manufactured in accordance with B.S. 3514

Joints (3) and (4) shall be made with approved cement mortar mix.

Asbestos Cement Soil Waste and Ventilation Pipes

Where spigot and socket asbestos cement pipes and fittings are used in connection with the conveyance of soil and waste or ventilation purposes in above ground applications, they shall be manufactured in accordance with B.S. 583.

Pipes and fittings shall be joined with cement/sand mortar cement content not to be greater than 30% of a fib rough cementitious jointing compound.

Alternatively, if synthetic rubber rings are used, the annular space between socket and pipe above the ring shall be packed with a suitable mastic compound.

Rubber rings shall comply fully with the requirements of B.S 2494.

VALVES

Draw-offs and Stop Valves (Up to 50mm, Nominal Bore)

Draw off taps and stop valves up to 50mm nominal bore, unless otherwise stated or specified, for attachment or connection to sanitary fitments shall be manufacturer in accordance with the requirements of B.S 1010.

Gate Valves

All gate valves 80mm nominal bore above, other than those required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of B.S 3464.

All gate valves required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of B.S. 1218

All gate valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirement of B.S.1952.

The pressure classification of all gate valves shall depend upon the pressure conditions pertaining to the site of works.

Globe valves

All globe valves up to and including 65mm. nominal bore shall be of bronze construction in accordance with B.S. 2060.

All globe valves 80mm. nominal bore and above shall be of cast iron construction in accordance with the requirements of B.S. 3961.

The pressure classification of all globe valves shall depend upon the pressure conditions pertaining to the site of works.

Check or Non-Return Valves.

All check or non-return valves up to and including 65mm nominal bore shall be of the swing check of bronze construction in accordance with B.S. 1953

All check or non-return valves 80mm nominal bore and above shall be of the swing check type of cast iron construction in accordance with the requirements of B.S 4090

The pressure classification of all check-non-return valves shall depend on the pressure conditions pertaining of Site of Works.

Ball valves

All ball valves for use in connection with hot and cold water services shall be of the Portsmouth type in accordance with the requirements of B.S 1212, constructed from classification as follows: -

a)	Low Pressure	3.538 b maximum
b)	Medium Pressure	7.725 b maximum
c)	High Pressure	12,620 b maximum

The pressure classification required for each ball valve will be designated in the description of its associated equipment contained in Part C of the Specification.

Manually Operated Mixing Valves

Mixing valves for shower fittings and other appliances being provided under the Sub – contract Works shall be manufactured In accordance with the requirements of B.S. 1415 from bronze or other corrosion resistant materials

WASTE FITMENTS TRAPS

Standard and Deep Seal P & S Traps

Where standard or deep seal traps are specified they shall be manufactured in suitable non-ferrous materials in accordance with the full requirements of B.S. 1184.

In certain circumstances, cast iron traps may be required for cast iron births and in these instances bath traps shall provide which are manufactured in accordance with the full requirements of B.S 1291.

Anti-siphon traps

Where anti-siphon traps are specified, these shall be similar or equal to the range of traps manufactured by Greenwood and Hungers Limited, Deacon Works, Little Hampton, Sussex, England.

GENERAL

Drain pipes have been measured over all bends, junctions and other fittings and the contractor shall include in his prices for all joints, short lengths, cutting and waste. Rates for bends, junctions, etc. shall include for extra joints, cuttings and waste and any other labour required.

Lines of drains shall be accurately set out and trenches excavated and bottom trimmed to accurate gradients to approval before pipe laying commences.

Generally the drainage is to be executed in suitable sections to cause the minimum interference to the continual use of any existing drains. The location and depth of any existing drains shall be ascertain before other work is commenced and the rates are to include for all costs of complying with this requirement.

Excavations for drain trenches shall be not be less than 300mm. wider than the external diameter of the pipes and rates shall include for grading ground under beds, carefully filling earth to avoid damaging pipes, ramming and carting away surplus excavated material, keeping excavations free from water, if necessary executing such

works and installing such pumps as may be required to keep the excavations dry at all times, and necessary planking strutting.

No subsoil water shall be discharged into the sewers without the written permission to the Project Manager.

Excavations shall be made to such depths and dimensions as may be required by the Project Manager to obtain proper falls and firm foundations. No permanent construction shall be commenced or any bottom until the excavation has been examined and approved by the Project Manager. Should the Contractor in error or without instruction of the Project Manager, make any excavations below the required level of the drain or bed, as the case be, he will be required to refill such excavations to the correct levels with concrete (1:4:8 –38mm gauge)

Rates shall include for excavating in all materials met with and for trimming bottoms to the necessary falls and working space.

The first back filling of pipes trenches is to be of material free from stone and shall be watered and carefully tamped over and around the pipes in 300mm layers until they are covered to a depth of 600mm. subsequent filling is to be in 150mm layers watered and rammed, only materials approved by the Project Manager are to be used for backfilling.

Where hardcore is used for backfilling it is not to exceed 150mm gauge and all interstices shall be properly filled with small pieces and fine binder. Surplus excavated materials are to be removed from the site.

If in the opinion of the Project Manager care has not been exercised in refilling trenches, he may order a fresh test to be on the drain. In the event of the drain failing to pass the test the Contractor will be required to remedy the fault in his own expense.

Concrete beds and surrounds shall be of concrete 1:3:6-20mm gauge to the thickness falls, and widths specified. Hollows shall be left to receive the collar of the pipe, so that the pipes sufficiently wide to form hard-holds to permit the joining of pipe, and after joining of pipe, and after resting drains shall be haunched to both sides to half the diameter of the pipe in similar concrete.

Where pipes are specified to the surrounds, the concrete shall be carried up from the bed in a square section with a minimum of 150mm in thickness over the barrel of the pipe.

Rates for beds and surrounds shall include for forming recesses and filling with concrete, for mortar layer etc. and for any necessary formwork.

Each pipe shall be carefully examined on arrival, any defective pipes shall be removed immediately from site and not used in the works. Minor damage to the protective coating of cast iron pipes shall be made good by painting hot tar; if major defects in the coating exists such pipes shall be rejected and removed from site.

Drains are to laid in a straight line from point to point and each pipe is to be properly bowed in so that the invert is a true and even gradient and set up and maintain all sight rails, bowing rods, and bench marks etc, necessary for the purposes.

All drains shall be kept free from earth debris, superfluous cement and other obstructions or water during laying and until completion of the contract when they shall be handled over in a clean condition.

Pipes shall be laid with sockets leading uphill and shall rest on solid and even foundations for the full lengths of the barrel, sockets recesses shall be formed the foundations, as short as practicable but sufficient deep to allow the pipe jointer room to work right round the pipe. Such recesses shall be filled with cement mortar (1:4) on completion of laying.

All joints are to be accurately made by butting the pipes together, caulking with tarred rope neat cement finished externally with bold fillet neatly pointed. As each pipe is laid it is to be drawn with a badger and left of all obstructions.

Rates of bends junctions and other fittings in drains shall include all cuttings and waste and extra joints.

The tasting of drains shall be done at completion and before the trenches are filled in. They shall be tested in the presence of the Project Manager and a representative of the Local Authority by filling with water having a head not less than 1.5m at the highest point of the section under test. A second and similar test may be applied, after the drain trenches are filled in and the work completed.

Manholes shall be constructed in the positions indicated in the drawings or as instructed by the Project Manager. Such chambers shall be to the depth required to obtain even gradients in the drain and of sufficient size to contain and requisite main channel and by branches thereto and all the entire satisfaction of the Project Manager and the Local Authority.

Rendering the manholes shall be trowelled smooth coved at all internal angles and rounded at arises.

Manholes are to be tested for water-tightness in the same way as to drain by filling with water but not exceeding 105mm head. The contractor shall apply all testing apparatus and materials necessary for these tests and provide all labour and assistance required. Any failure whatsoever in the drainage system to withstand the specific tests and any defects appearing are to be made good and the drains re-tested to the satisfaction of the Project Manager and the Local Authority.

For connection to public drainage the Contractor shall make all arrangements with the Local Authority.

For connection to public drainage the Contractor shall make all arrangements with the Local Authority and pay all fees that may be required for connections to main sewer.

TESTING AND INSPECTION.

Site Tests – Pipe works System

Underground Drainage System.

A site test shall be carried out on all drainage pipes before concrete haunchings or surrounds are applied. These tests shall be carried out preferably from manhole to manhole.

Short drains connected to a main drain between manhole shall be tested as one system with the main drain and the branch tested separately. After the tests have been passed, the testing junction shall be effectively sealed.

All tests on underground drains shall be water tests. Smoke tests shall not be permitted

In certain circumstances air tests may be permitted on cast iron drain at the discretion and to the approval of the Project Manager.

Water tests shall be carried out in accordance with the methods described under B.S. Code of Practice 301, Clause 601 (b) and (c) and the test pressure shall not be less than 1.520mm head at the highest point in the pipe section and not ore that 10.360mm at any point in the section.

The test pressure shall be maintained for a period of one hour during which time the pipes and joints shall be inspected for sweating and leakage. Any leaks discovered during the leaks shall be made good by the sub-contractor and the section re-tested.

In addition to pressure tests, drainpipe runs shall also be tested for straightness where applicable. These tests shall be carried out in accordance with one of the tow methods described in B.S. Code of Practice 301, Clause 601 (f).

Above Ground Soil Waste and Ventilation Pipe Systems.

All soil, waste and ventilating pipe system forming part of the above ground installation shall be given a smoke test to a pressure of 38mm of water gauge and this pressure shall remain constant for a period of not less than 3 minutes.

Water tests on above ground soil, waste and ventilating pipe systems shall be permitted.

Pressure tests shall be carried out before any work which is to be concealed is finally enclosed.

Any defects revealed by the tests shall be made good by the Sub-contractor and the test repeated to the approval of the Project Manager.

In all other respects, tests shall comply with the requirements of B.S Code of Practice 304.

SITE-TEST PERFORMANCE

Following satisfactory tests on pipework systems, operational tests shall be carried out in accordance with the relevant B.S. Codes of Practice on the system as a whole to establish the special valves, gauges, controls, fittings equipment and plant are functioning correctly to the satisfaction of the Project Manager.

EXTERNAL WORKS

EXCAVATIONS

GENERAL

Earthworks shall be deemed to include excavation, filling, grading and compaction of all types of soil, sand gravel and rock as required in the construction of works and as specified in drawings or as directed by the Project Manager.

In execution of works, the contractor shall take all necessary measures to prevent causing nuisance to any neighboring land by causing flooding, erosion and deposition of sediments in drain.

Removal of Top Soil

Unless otherwise directed by the project manager, all surface soils shall be removed form areas to be used for cuttings and embankments and stockpiled for re-use for any purpose such as soiling of slopes of embankment and spreading on top of seepage beds.

The use of tope soil as a fill material shall be restricted to surface layers in position not subject to loading by pavements of structures.

Formation Level.

Formation level on embankments and in cuttings shall be the surface level of the ground obtained after completion of the earthworks, i.e. the underside of the sub- base, or where no sub-base s specified, the underside of the base. Any excess depth unnecessarily excavated below formation level shall be back-filled with material acceptable for construction and compacted as directed by the Project Manager and no payment shall be made for excess excavation or for the filling and compacting. The levels of tolerance of irregularity of the surface of the course shall be within the limits specified for sub-grade.

Removal of Unsuitable Materials

Materials which do not comply with the Specifications for fill Material for embankments, sub-grade, sub-base or base shall be excavated to such a depth and over such areas as shown on the drawings or as directed by the Project Manager. Unsuitable material shall comprise:

(i) Materials from swamps or marshes, silt, perishable material, slurry or mud or
(ii) Any materials:
    a) Which is highly organic clay or silt;

b) Which is clay having a liquid limit exceeding 55 and/or a plasticity index exceeding 20;
c) Which is outside the limits of moisture content specified in the earthworks series of clauses either when excavated or thereafter;
d) Which is susceptible to spontaneous combustion;
e) Consisting of such domestic refuse which but virtue of its physical or chemical composition or moisture content will not compact to form stable fill.

Suitable material shall comprise all that which is acceptable in accordance with the requirements of the Specification for use in the works, whether obtained from within or outside the site. Any reference in this and other Clauses of the specification to suitable material shall have meaning defined above.

For the purpose of selection for use in earthwork all common excavation shall be classified as either plastic or non-plastic. Non-plastic materials shall be defined as those on which it is impossible to carry out a plasticity index test and shall include "course grained, non-cohesive materials" included in Table I of British Standard B.S 6031: Earthworks, and such sales, silts and other material which in the opinion of the Project Manager are readily self draining.

Plastic materials shall be defined as all other materials included in the above mentioned Table as "fine grained cohesive m a t e r i a l s ", as defined in BS6031.

Unsuitable material shall be removed to locations outside the area of the site works provided by the Contractor and approved by the Project Manager. All stray and isolated rocks or builders found in the road bed which may affect the consolidation shall be excavated to a depth of not less than 250mm below the bottom of the pavement and the excavated areas back-filled with suitable materials, which shall be placed and compacted by mechanical rammer to at least 100% maximum dry density in B.S Standard Compaction test.

Excavation of Cutting in Soil

Cuttings shall be shaped by excavation to the line, levels, slopes and width as shown on the Drawings with due regard to settlement by compaction of formation level. Before commencing excavations the contractor shall measure and record, in agreement with the Project Manager, the existing ground levels over the site of the works.

When boulders are encountered in cuttings, the side slopes shall be cut back beyond those shown on the Drawings, if necessary, to avoid rock falls after completion.

Excavation of Cutting in Rock.

Before the commencement of any part of the excavations which shall be claimed to be in 'Rock' the attention of the Engineer shall be called to the same and a section of the surface prepared which shall form the basis of subsequent measurement.

In cases where drilling and blasting must be carried out, all completion excavation lines shall be in accordance with the typical cross-sections. Within the limits of the shoulders, all rocks depth of 300mm below the bottom of the pavement or as directed by the Engineer and backfilled.

The contractor shall comply with all statutory requirements in respect of the use and storage of explosives and shall be responsible for obtaining the necessary licenses.

During blasting operation, the Contractor shall exercise care not to overshoot, and shall be required to remove at his own expense, any material outside the authorized cross-section which may be shattered or loosened by the blasting. Excavation of rock shall be planned and performed with reuse of the materials in mind.

Disposal of Excavated Materials

The Contractor shall plan and perform the earthwork with regard to the best possible utilization of the different materials in the excavations, especially to use the best available soil in the upper 300mm of the sub grade. Before commencing the earthwork the Contractor shall submit to the Project Manager a programme for disposal of excess materials.

Obstructions

The contractor shall at his own expense, take all reasonable precautions against damage to all pipes, ducts, cables, roads, structures etc. encountered during excavations and shall be responsible for the cost of repairing any damage caused by his acts or omissions or causes within his control.

Preparing Ground Surface Under Embankments

The Contractor shall ensure that the natural ground is cleared of vegetation, rubbish and soft and wet materials unsuitable for embankment construction. All necessary work to drain the natural ground shall be executed. slopes greater than 1 in 2 shall be formed into horizontal terrace not less than 2m wide.

Construction of Embankments

Embankment material shall be placed in successive layers not exceeding 150mm after compaction unless the Contractor proves by testing to the Project Manager's satisfaction that his compaction equipment is able to compact in greater layers. Each layer shall extend over the full width of the embankment and shall be compacted according to requirements before the next layer is placed.

It is the Contractor's responsibility that only approved materials are incorporated in embankments. If any suitable or oversize material is included it shall be removed and placed with suitable material.

In forming embankments, the Contractor shall make due allowance in height and width for consolidation and shrinkage. On the completion of the Contract, the levels, width and dimensions of the finished surface of the carriageway on embankment shall correspond to the levels and dimensions shown on the drawings.

Where the CBR value of the fill material obtained from general excavation is less than 8% at BS Compaction after 48 hours soaking then the Project Manager shall instruct the Contractor to provide selected fill in the upper layer or layers of embankment. The thickness of the selected fill, material shall be determined by the Project Manager's Representative.

In cutting where the soaked CBR value of the sub grade is lower than 8% the Project Manager shall similarly instruct the Contractor to replace the upper layer or layers with selected fill material.

The fill material shall preferably conform to the following requirements:

Liquid Limit	0-45%

Plastic Index	0-20%
Linear Shrinkage	0-10%

Compaction

All fill and sub grade shall be compacted to at least 100% of the maximum dry density obtained in the B.S Standard Compaction as follows:

- Top 150mm of natural ground before filling
- All fill in embankment
- Top 300mm of formation in both cut and fill
- The Contractor shall, when needed for proper compaction, distribute and incorporate water in the layer of fill to be compacted.

When the moisture content in some material is in the excess of that for proper compaction the wet material shall be allowed to dry before compaction is commenced.

Compaction Equipment

The Contractor shall provide and maintain on the site for the whole period during which earthworks are in progress adequate and suitable compaction equipment approved by the Project Manager which is capable of compacting the various types of material included in the works to such densities and at such moisture contents as are specified herein.

The Contractor shall also provide such other pneumatic tired and smooth tired rollers, tower vibrating rollers, grid rollers, vibrating floats and mechanical rammers as may be required.

The equipment shall be of specific set out in the General specifications standard or higher in order to achieve the specified compaction standards.

Testing

The Contractor shall determine the dry density of compacted earthwork at the following maximum frequencies. The result of the Contractor's findings shall be submitted to the Project Manager, who may approve or reject a volume of compacted earthworks on the evidence of the Contractors tests or he may carry out tests himself in additional:

i) The top 150mm of the compacted original ground under embankments in areas where compaction is specified or has been ordered by the project Manager: 1 density test per 1000m^2.
ii) All fill in embankments except the top layer:1 density test per 1000m^2
iii) Formation in cutting and fill: 1 density test per 400m^2

The contractor shall carry out a B.S Standard Compaction test including CBR test and a set of Atterberg Limit tests on soil samples from at least every tenth dry density determination tests carried out as above. He shall also carry out a BS Standard Compaction test on soil sample from any dry density determination which failed to reach the specified percentage of soil in which it is related in the above mentioned 1:10 representative group.

Diversion of Water

Excavation and filling operation shall be carried out with side slopes so that water can run off the surface. The contractor shall at his own expense maintain sufficient drainage of the works to prevent ponding and scour.

Tolerances

The finished sub grade and shoulder levels shall at no place vary more than 15mm above or below the levels shown on the Drawings. Deviations shall not be one sided.

Improved Sub-grade

Where necessary the contractor shall be responsible for providing material for earth-works fill that is required over the above that which is available from cuttings on site. His rates for this work shall include for all costs incurred in provision of this material such as purchase of the land, site clearance, overburden strip, haulage, processing, spreading compaction and any other associated costs.

Sub-base

Unless otherwise specified or directed by the Project Manager, the materials for sub-base shall comply with the following requirements:

- CBR of at least 30
- CBR shall be measured at a dry density corresponding to 95% MDD (Heavy compaction) and after 4 days soak.
- Plastic index - maximum 25
- Los Angeles value - maximum 70
- Aggregate crushing - Maximum 50
- Shall have a grading curve of materials after processing and compaction within the following envelope:

SIEVE SIZE	PERCENTAGE PASSING
80	100
63	95-100
50	90-100
40	85-100
28	72-100
20	55-100
10	30-100
5	18-85
2	10-65
1	8-52
0.425	7-42
0.75	4-35

HAND PACKED STONE BASE COURSE

Hand packed stones

In addition to requirement of clause 9709 of General Specification stones used shall comply with the following:

Aggregate crushing value (9.V.C).	Not more than 40%
Los Angeles Abrasion (L.A.A).	Loss on 5 cycles not more than 12%

The hand packed stone base course will consist of stones of such grading and size that they pack firmly when they are laid by hand. The greater number of stones shall be higher than the thickness of the layer laid. Stones shall be free of top-soil or other deleterious material.

Stone Dust

Stone dust for building shall be blank trap or similar approved screened to the following grading:

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

PRE-MIX

Prime Coat

The pre-mix Surfacing shall consist of a tack coat and a wearing course of specified thickness.

The tack coat shall be anionic Emulsion A1 – 55 sprayed at the rate of 0.5 litre/sq. metre.
Prior to application of the tack coat existing surface shall brushed off all loose material to the satisfaction of the Project Manager.

The tack coat shall be spread in one even layer to the widths as shown on the drawings by the Project Manager by pressure distributor. Hand spraying shall not be permitted except in small areas when approved by the Project Manager.

Wearing Course

The bituminous binder used shall be straight run bitumen of grade 80/100 penetration. Nominal bitumen content should be between 4.5 to 8.0% by weight of the mix.

The nominal size of aggregate for 25 mm thick wearing course shall be 13 mm and nominal size aggregate for 50 mm thick wearing course shall be 14 mm. Grading envelopes shall be as follows:

Sieve size	Percentage passing
20	*100*
14	*90 – 100*
10	*70 – 95*
6.3	*55 – 85*
4	*46 – 75*
2	*35 – 60*
1	*25 – 45*
0.425	*17– 32*
0.300	*11 - 27*
0.150	*6 - 17*
0.075	*3 - 8*

Sampling and testing Pre-mix

Sample of the premix should be done on the vehicles as follows:

1. Sample should not be taken within 300 mm of the side of the vehicle.
2. 3 locations should be sampled from each vehicle
3. Each location should produce 7 kgs and they should then be combined as one sample of minimum weight 21 kg.
4. 100 mm of material should be removed from the top layer of the sampling location and discarded. The underlying material shall then be removed care being taken to ensure loose material from the sides does not fall back into the sampling hole.
5. A square mouth shovel should be used for above purposes
6. The position in the works of each sample load shall be recorded on drawings.

7. The bagged samples should be delivered to Materials Branch or other approved laboratory immediately for analysis of binder content and the grading of the aggregate.
8. Delivery and rolling temperature should be taken for each load and recorded using proper thermometers.
9. Specified rolling procedure must be complied with.

The working mix shall comply with the following requirements:

Marshal Stability N	6000 (Minimum)
Flow value	2 mm – 4 mm
Mix % by weights	4.5 – 8 %

The Project Manager will have the right to take samples of the actual mix and of ingredients as often as he considers necessary to determine whether specified requirements are confirmed with.

Before pre-mix is laid existing surface shall be cleaned of all loose or deleterious material. No pre-mix shall be aid until the surface had been approved by the Project Manager.

Pre-mix shall be laid by approved mechanical pavers to correct thickness, line and camber. The mixture shall be laid at temperature between 120 deg C to 150 deg C.

Immediately after spreading, the mixture shall be compacted by 8 to 10 ton smooth wheel roller and final compaction shall be done by 7 – 10 ton tired roller.

ROAD MARKING

Paint for road marking shall comprise of Robialac Epoxy Road Marking Paint or similar paint of equal quality.

Paint shall be applied in two coats if applied by the brush and one coat if applied by the spraying machine.

Before the paint is applied the area to be painted shall be cleared to remove all dirt, grease, oil laitance or any other foreign matter which shall reduce the bond between the paint and the pavement. Paint shall be applied to surfaces which are clean and dry and painting shall not be carried out when the weather is excessively windy or dust

Road Marking (Contd.)

Sub-Contractor shall provide experienced technician to supervise setting out of the areas to be painted and the application of the painting. The Sub-Contractor shall protect painted areas from all traffic and from injury or damage of any kind until the painting is completely dry.

White marking shall be to approximately B.S. Colour No. 102, white of B.S.S 381 C.

Yellow markings shall be to B.S. Colour No. 305 (Lemon) of B.S.S 381 C (Colour 0.002 of B.S.S. 2660).

Concrete Kerbs Quadrants and Channels

Precast concrete Kerbs and edgings shall be laid and bedded on a 12mm layer of cement mortar (1:6) on a foundation or haunch of concrete mix. 1:3:6 as shown on the drawings.

All Kerbs, channels and quadrants shall be joined with cement mortar (1:3). No joint shall exceed 12mm in width.

Specially cast circular Kerbs and edgings shall be used on curves where the radius is 20 metres or less.

All kerbs and edgings shall be laid true to line and level any unit found to be more than 3mm out of line or level at either end shall be lifted and relayed.

Precast concrete kerb, quadrants & channel have to be in accordance with B.S 340 and are to be placed as indicated on the drawings.

DRAINAGE

General

The whole of the works are to be set out by the Sub-contractor who will provide fix and maintain properly constructed sight rails of 150mm x 25mm wrought soft wood painted black and white and secured to strong uprights embedded firmly in ground at intervals not exceeding 40 metres.

Trenches for pipeline shall have a width not less than that shown on the drawings and must have vertical sides unless the Project Manger has approved the use of sloping sides in lieu of shoring.

In rock, the trench shall be taken out to a minimum of 100mm below the underside of the pipe and before the pipe is laid, approved, selected fill shall be placed.

Trenches for pie laying must be kept from all water all times.

Cars should be taken in handling of pipes and channels. Any pipe or channel damaged due to improper handling storage or negligence will be condemned and removed from site.

Backfilling of trenches

Back of trenches up to a level of 300mm above the pipe shall be with suitable fine material with maximum particle size of 20mm and shall placed in layers not exceeding 150mm in depth, kept at the same level on each side of the pipe and carefully rammed under and around it.

Subsequent filling shall be with the same material in layers not exceeding 150mm in depth, and each layer shall be thoroughly rammed and consolidated using approved equipment, or method, before another layer is added. Backfilling material shall be brought above the required formation level to allow for subsequent settlement.

Where embankments re required to ensure sufficient cover to the pipes they shall be constructed to the dimensions shown on the drawings or indicated by the Project manager. They shall be built up evenly over their full width in layers not exceeding 150mm and consolidated using vibrating hard rollers, vibrating plates or similar approved plant. The cost of trimming the sides to shape and forming drainage ditches at the toe shall be included in the rates.

Pipe bends, Junctions and Fittings

Pipes for sewers shall either be UPVC class 41 to BS 4660 or precast concrete pipes to BS 5911: Part I, as specified in the drawings.

Concrete pipes for surface water drainage shall be spun concrete pipes with ogee joints to BS 4101. Pipes shall be bedded and surrounded by minimum of 150mm of concrete grade 10 to BS 8110.

Coarse Granular Fill

Coarse granular fill in seepage beds shall be broken stone between sizes 15 to 25mm.

Laying Pipes

Each pipe shall be carefully examined on arrival; any defective pipe shall be removed immediately from the site and to used in the works. Minor damage to protective coating of cast iron pipes shall be made good b painting with hot tar, if major defects if the coating exist, such pipes shall be rejected and removed from the site.

Drains shall be laid in straight lines and to even gradients as required and to the satisfaction the Project Manager.

Great care shall be exercised in setting out and determining the levels of the pipes and the contractor shall provide suitable instruments and set up and maintain all sight rails, boning rods and bench marks, etc, necessary for the purpose.

All drains shall be kept free from earth, debris, superfluous cement and other obstructions or water during laying and until completion of the contract when they shall be handed over in a clean condition.

Pipes shall be laid with the sockets, leading uphill and shall rest on solid and even foundations for the full lengths of the barrel. Socket recesses shall be formed in the foundation, as short as practicable but sufficiently deep to allow the pipe jointer room to work right round the pipe. Such recesses shall be filled with cement mortar (1:4) on completion of laying.

Inspection Chambers

Inspection chambers shall be constructed in the positions indicted o the drawing or as required by the Project manager. Such cambers shall be to the depths required to obtain even gradients to the drain and of sufficient size to contain the requisite main channel and any trenches thereto and all to the entire satisfaction of the Project Manager.

Protection PVC Pipes

PVC pipes under roads and in verges shall be protected by concrete slab where the cover is less than 1.2m over the soffit o the pipe.

Cement Mortar

All block work exposed to air shall be plastered with mortar group 1, 1:3.

Where used for bedding stone and concrete blocks one volume of Portland cement to five volumes of sand to be used.

For rendering one volume of Portland Cement to three volume of sand shall be used.

Concrete Blocks

Natural stone blocks complying with sections G08 and Go9 of General Specifications can be sued. The source of stone blocks shall be approved by the project Manger and stone supplied there from shall be free from Magadi, overburden, mudstone cracks, sand holes, veins, laminations and other imperfections. Concrete blocks shall be in accordance with B.S. 6073.

Concrete blocks shall be hard, true to size and shape with sharp arises and shall comply with BS 2028 and CP 111 Part 2, of minimum crushing strengths %N/mm^2 maximum density 1500 kg/m^3 and minimum density of 1000kg/m^3. They shall be obtained on manufactured on size in approved block making machines.

Manhole cover and Frame

Manhole cover and frames shall comply with B.S. 497. In trafficked areas heavy duty manhole cover and frames shall be provided. In other areas light duty manhole cover and frame shall be provided.

Step Irons.

In manhole more than 1.2m deep step irons of malleable cast iron with galvanized finish condiment to B.S. 1247 shall be provided.

Testing

Each length of drain and manhole shall be tested as described hereinafter and approved b the project manager before any backfilling of the trench takes place. Sewer pipes shall be tested generally in accordance with CP 301.

Testing shall not be carried out until at least 12 hours have elapsed after the jointing of the last pipe.

The test shall be as follows: -

(i) The lower end of the pipe and all junctions shall be securely stoppered and the whole length under test filled with water.
(ii) When full a further stopper shall be inserted at the top leaving a pipe attached to the drain plug. This pipe shall be bent through 90^0 and shall terminate in a header tank shall be 225mm square. The vertical distance between the Centre line of the drain plug and the top of the header tank not less than 1.00 metre.
(iii) Water shall then be poured into the header tank, which shall be kept full for a minimum period of 3 hours to allow absorption to take place. At the expiration of this period the header tank shall be topped up and the testing of the drain commenced. If, after a further period of 30 minutes, the water level in the header tank has not fallen b more than 12mm the test will be considered satisfactory.
(iv) In the event of a pipe failing to withstand the test, the point of failure shall be completely surrounded, at the Contractor's expenses, with concrete

(Grade 10 – 20mm maximum aggregate) so that there is minimum cover of 150mm in all directions. The length shall then be re-tested.

(v) Immediately and length of drain has been approved the trench shall be backfilled for a depth of at least 300mm above the top of the pipes.

CONCRETE WORKS

General

All concrete shall be produced and tested to comply with requirements of BS 8110 and BS 5328.

The constituent materials shall comply with the relevant British Standard

Concrete mixes

The following grades of concrete shall be used (Max. size of aggregate in brackets).

Blinding:	Class 15(30)
Beams slabs and columns:	Class 20(20) and Class 25(20)
Foundation:	Class 20(20).

A. Fencing Generally

The level of the top of fencing is to be as directed by the Architect but is generally to follow the mean level of the ground on the line of the fencing. Any minor excavations on the line of the fencing to enable this to be achieved to be allowed for in the rates.

B. Chain Link Fencing with Concrete Posts

Fence posts to be concrete Class "D" finishes fair on all exposed surfaces.

Intermediate fence posts shall be paced at 3.00 metres intervals, to be of 125mm x 125mm section tapering to 75mm x 75mm at top and 2800mm long overall.

The post to be reinforced with four 8mm diameter mild steel bars with No. 12 S.W.G. wire binders at 600mm centres and six times holed for wires or fixing bolts.

Raking struts to be of 200mm diameter section and 3000mm long overall with one end splayed to suit notch in main post. The strut to be reinforced with four 20mm diameter mild steel bars with No. 12 S.W.G. wire binders at 500mm centres and four times holed for wires or fixing bolts. At the junction with the main or gate post the strut is to be bolted on with one 20mm diameter wrot bolt with head, nut and two washers.

Main posts, spaced at 9.00 metres centres, and corner posts to be of 150mm x 150mm section and 2800mm long overall. The post to be reinforced with four 10mm diameter mild steel bars with No. 12 S.W.G. wire binders at 600mm centres, ten times holed for wires or fixing bolts and twice notched as required to receive end of raking struts. Two side faces of post to have set of angle cleats and vertical clamp bars as last described bolted on.

Concrete filling around post bases to be in plain concrete Class "E".

Intermediate and main post bases to be excavated to allow posts to be let into the ground for a vertical depth of 750mm and filled with 600mm diameter x

400mm deep concrete well packed around post, the excavated material to be part returned, filled and rammed and the surplus removed.

Raking strut bases to be as last but let into the ground for a vertical depth of 600mm and filled with 450 x 450 x 300mm deep concrete.

Barbed wires to be No. 8 S.W.G. galvanized mild steel fixed complete with all galvanized staples strainers winding brackets and other necessary fittings. Fasten to intermediate concrete posts with No. 16 S.W.G. galvanized annealed mild steel wire.

Tying wire for securing chain-link fencing to line wire to be No. 16 S.W.G. galvanized annealed mild steel wire.

Chain-link fencing to be manufactured from No. 16 S.W.G. galvanized annealed mild steel wire woven into 50mm mesh with barbed top and 2000mm high or as specified. The fencing is to be supported by three single and one double (at top) lines of line wire and fastened to each line at 900mm horizontal intervals with tying wire.

C. landscaping and Site Development

Bush Clearing

All trees, stumps, shrubs, undergrowth and other vegetation shall be completely cut down and all roots entirely grubbed up and burned at a central point. All arising will be left on the site for use in the garden development. Where roots are grubbed up in areas which are to remain at existing ground level the resulting holes shall be filled up with approved material rammed in 150mm layers up to the existing ground level.

Grassed Areas

i) Areas to be grassed shall be cleared of all debris and roots and dug up to a depth of 300mm.
ii) Where outcrops of rock or murram occur, these will be covered with suitable soil to a depth of 150mm.

Maintenance

The trees, grass and flowers shall be watered and maintained until well established. The contractor is advised to include all this in his rates.

Grass Planting in The Works

Grass planting over rock or compacted fill material

Where grass is to be established in areas where decomposed or solid rock or other fill material exists closer to the finished surface than 200mm, the following grass planting procedure shall apply.

The rock shall be removed to a depth of 200mm below the finishes surface. The rock shall then be ripped or otherwise broken up to a further depth of 150mm and lightly compacted; 200mm of selected red soil shall then be spread over the surface. The whole shall then be lightly rotated to obtain a homogenous mixture to a depth of 150mm. Prior to planting, the soil shall be raked and 50 gm each per square metre of bone meal and hoof horn meal shall be spread on the surface.

The grass shall be cuttings of approximately 200mm long and shall be planted at 150mm intervals, 150mm burred in the soil. Planting shall be carried out with the aid of a wooden peg and the soil well rammed around the cuttings.

The grass shall be systematically watered, cut and weeded to maintain it in a healthy state throughout the maintenance period.

The rate for grass planting over rock shall include for the ripping of the rock, provision of grass and all subsequent materials, tools, etc.

D. Trees and Palms Planting

Pits shall be 0.9 metre diameter x 0.9 metre deep. The sides shall be undercut and the soil mixture shall be as follows: -

4	Parts approved red soil
1	Part sewage sludge

These shall be thoroughly mixed together on the mixing ground and specifically set aside for the purpose. The mixture shall be filled into the pits in 300mm layers, firming with hard earth rammers at each layer. The surface is to be shaped into a bowl-depression 200mm deep to assist in watering.

The tree plants are to be at least 0.9-metre-high when brought to the works for planting.

In the two days before planting takes place, each pit is to be thoroughly soaked with 100 litres of water. The trees or palms shall be planted and sticked in an approved manner, well-watered and maintained throughout the maintenance period.

The rates for tree planting shall include for provision of plants and materials described in this clause.

E. Planting Shrubs

Pits for shrubs shall be 750mm diameter x 750mm deep. They shall be excavated, refilled, planted, maintained and paid for identical manner to trees and palms. All shrubs are grouped together and the tenderer is to give a uniform rate that covers the cost of any of the shrubs.

F. Herbaceous Borders, Plant Boxes and Similar Areas

Plant boxes, herbaceous borders and similar areas shall be excavated, refilled, planted, maintained and paid for in an identical manner to trees and palms, excepting that four parts of forest soil shall be used in place of red soil and 50 gm each per square metre of bonemeal and hood and horn meal shall be spread on the surface of the soil mixture before planting.

G. Bouganvillea Hedges and Tables

Bouganvillea hedges and tables formed on fencing and fencing tables shall be planted between 100mm diameter cedar fence posts in a pit 0.75-metre-deep and 0.75 metre diameter filled as described above.

For tables, one plant is to be planted every 10 square metres as directed by the Architect.

Bouganvillea hedge plants are to be planted at 2.0 metres intervals. The cedar posts are 600mm high and placed at 2.0 metres centres with barbed wire stacked at the top.

Bouganivillea plants are to be attached to the fence wires and strained into a hedge or table in the course of the maintenance period to the approval of the Architect. The plant pits are to be excavated, refilled, planted, maintained and paid for in accordance with the requirements laid down for shrubs.

The rates for bouganivillea plants and hedges and tables shall also include for all the materials and operations described in this clause. Fence for bouganvillea hedges are measured lineally and fence tables are measured superficially over the area formed by the outermost wires of the table.

PREAMBLE AND NOTES TO BILLS OF QUANTITIES

1. These Bills of Quantities form part of the Contract Documents and are to be read in conjunction with the conditions of Contract, Standard and Special Specification and Drawings.

2. The quantities set forth in the Bills of Quantities are believed to represent the character of the work to be carried out. There is no guarantee to the Contractor that he will be required to carry out the quantities of work indicated under any one particular item or group of items in the Bills of Quantities, though on the Contract as a whole the quantities are believed to represent the overall value of the work to be carried out.

3. The prices and rates inserted in the Bills of Quantities will be used for valuing the work executed and the Engineer will measure the whole of the works executed in accordance with the Contract.

4. The prices and rates inserted in the bills of quantities are to be the full inclusive costs of the works described under the items, complete in place and in accordance with the Specification and Drawings including costs and expenses which may be required in and for the construction of the works described, together with any temporary works and installations which may be necessary and all general risks, liabilities and obligations set forth or implied in the Documents on which the Contract is based.

5. The brief description of the items given in the Bills of Quantities are purely for the purpose of identification and in no way modify or supersede the detailed descriptions given in the Conditions of the Contract, Specifications or Drawings and Special Specification for the full directions and descriptions of work and materials.

6. A price or rate is to be inserted, in ink against each item in the Bills of Quantities, whether quantities are stated or not, and if the Tenderer includes the cost of a particular item elsewhere in his rates or prices, he shall insert in the word “nil” against both the rate and extension of that particular item. Should the Tenderer omit to price an item, then it will be assumed that he has included the cost of the item elsewhere in his rates or prices.

7. No alteration shall be made to the Bills of Quantities and no extra item shall be inserted. The Tenderer shall satisfy himself that the Contract Sum arrived at by pricing the quantities and items given is sufficient compensation for constructing and maintaining the whole of the works in accordance with the Contract Documents.

8. For the purpose of payment by Interim Certificate of "Lump Sum" items the Engineer may assess the portion of the work completed on the "Lump Sum" items and allow for payment the portion of the "Lump Sum" he deems fair and reasonable. The total of all portions allowed shall not exceed the "Lump Sum". All interim payments shall be subject to the retention stipulated in the Contract Documents.

9. During construction the unit rate established for an item in one Bill of Quantities may be used as a basis for establishing a unit rate for similar work in another Bill of Quantities which contains no unit rate for the said item.
10. The Contractor will be provided by Employer with all that land occupied by the Permanent Works including the specified working width for pipe laying and the costs of compensation and entry upon land will be paid from Provisional Sums.

11. It shall be the responsibility of the Contractor to arrange for the removal of, or alteration to, services where necessitated by the Works. Incurred costs being paid by the Employer.

12. Quantities for site clearance stripping and spreading shall be based on the horizontal projection of the area cleared or stripped.

13. The rates for excavation items shall include inter alia for setting aside spoil for reuse in the Works or disposing to approved tips, except where otherwise provided for in the Bills of quantities.

14. Generally, the excavation items are based on volume for structures and on linear measurement for certain pipelines. One or more items may cover the works. The rates shall include as appropriate for:-
    a) Breaking through surfaces; handling different classes of material separately: excavation beyond the net plan area of the foundations for working space and for battering or timbering etc
    b) Timbering
    c) Dealing with water
    d) Backfilling as specified
    e) Disposal of surplus spoil

    Measurement of the volume in pipe trench will be measured from ground level to the invert of the trench. Measurement for other excavations will be to the size which is required to accommodate the permanent work. A tenderer shall accordingly allow in his

prices for any amount of extra excavation which may be necessary for working space to complete the work to the satisfaction of the Engineer.

Items are included for "Extra for Rock" on a volume basis. The rates shall include for Breaking out and any other additional costs and the items shall apply to work encountered within measured excavation. Different classifications may be billed separately. Rock shall be measured as a volume calculated from the thickness encountered within the plan area of a mass excavation, within the plan dimensions of a structure, or within the notional width of a trench. Timbering left in excavations shall only be measured for payment where it is specified or ordered by the Engineer.

15. When the site of any particular item of Works has been sufficiently cleared of trees, undergrowth etc. and before any excavation or filling has been carried out, the Contractor shall carry out survey
    under the supervision of Engineer's Representative to take, record and agree adequate ground levels. The data so obtained shall be used as a basis for the computation of excavation and filling.

16. The volume of fill will be measured net to the finished levels as shown on the drawings or as amended by the Engineer.

17. All reinforcement will be paid for on the basis of its computed weight except for reinforcement that will be paid for on the basis of the area placed. The unit rates inserted in the Bills of Quantities shall include for all necessary cutting, bending and fixing, and all additional bars which may be required as spacer supports and lacings and also for all soft iron tying wires, fixing clips of approved pattern and manufacture and chairs. The cost of all temporary works including clips, chairs etc. shall be included in the rates for the reinforcing steel.
    The weight for reinforcing bars shall include for all hooked or bent ends as per the bending schedule. Rates for fabric reinforcement or other reinforcement shall include for all laps, cuttings to size, bending and waste.

18. The rates for concrete shall include for making and testing preliminary test cubes, for making works test cubes and forwarding them to the Testing Engineer, forming the concrete to the slopes and falls shown on the drawings and any additional concrete used in excess of the net requirements. The rates shall also include for forming construction joints, for protection, for curing, for the rubbing down of exposed surfaces of concrete

after removal of formwork and for floating or brushing of other exposed surfaces where this is required.

19. The rates for precast concrete paving shall include for all cutting, bending, jointing and laying to falls.

20. The rates for precast concrete edging and kerbs shall include for formwork, concrete bed and backing, all cutting, bedding, jointing and laying to falls.

21. The rates for formwork shall include for fillets and chamfers up to 50mm wide on the spay, coating to prevent adherence of concrete and the provision of temporary openings to facilitate inspection and cleaning. Rates shall also be inclusive of all necessary box outs and cut outs for holes up to 1 square metre.

    The rates for forming rebates in concrete walls etc shall include for forming pockets for the fish tail fixing cleats where required. Deductions from formwork quantities will be made for openings more than 1 square metre in area.

22. Formwork for upper surfaces inclined at 15 degrees or less to the horizontal is not measured and the cost of any such formwork used will be deemed to be included in the relevant concrete item rate.

23. Wrought formwork where specified will be measured to 150mm below final ground level.

Abbreviations

E.O	Extra Over
Avg	Average
Max	Maximum
Min	Minimum
n.e.	Not Exceeding
mm	Millimetres
lm	Linear Metres
sm	Square Metres
cm	Cubic Metres
Ha	Hectares
No	Number
Drg.	Drawing
Kg	Kilogramme
H.T.	High Tensile
M.S.	Mild Steel
B.L	Bitumen Lined
C.I.	Cast Iron
D.I.	Ductile Iron
UPVC	Unplasticised Polyvinyl Chloride
G.I.	Galvanized Iron
G.M.S.	Galvanized Mild Steel
P.E.H.	Palothene
Hr.	Hour

31. The rates for metal work shall include for bolts, nuts, washers and rawl bolts, fixing as Specified or in accordance with the manufactures instructions and rectifying as specified any parts of the painted, coated or galvanized surface that may be damaged either before or after erection.

32. The rate for fixing penstocks and flap valves etc. shall include for bedding and grouting, testing for water tightness, greasing all working parts and leaving in good working order: where the item includes supply, the rates shall also include for supplying drawings for approval before manufacture is commenced.

Sewers, Drains and Pipelines

The rates for pipes, pipe work specials shall include for supply of all materials, setting of concrete blocks and hardwood wedges where specified, provide any temporary support that may be necessary, preparing ends of pipes for jointing and all labour in jointing, protection to detachable joints, cleaning pipelines and rectifying as specified any damage to surface coating. The rates shall also include for all cutting of pipes consequent upon structures, specials and fittings being construction in the designated positions.

33. The rates for concrete surround, bed and haunching to pipes, concrete in anchor blocks to pipes, and to gulley pots shall include for all formwork required and for any additional concrete the Contractor may place for his own convenience or by reason of the method or carrying out the work.

Prime Cost Items

34. Attendance on nominated Sub-Contractors shall include for all or any of the following as appropriate; labour, materials and plant required for taking delivery, carting, storing, hoisting and builders work entailed in fixing, erecting and installing as specified or in accordance with the manufactures instructions and all overheads and profits.

35. When, in the opinion of the Engineer, it is reasonable to expect the Contractor to price the attendance item it will be so included in the Bills of Quantities in all other cases it will form the subject of a Provisional Sum to be expended on a Day works basis.

36. Profit shall include for establishment charges, profit and any other costs not included in the attendance item.

The rates for the supply for any mechanical and electrical equipment shall include for witnessed works as directed by the Engineer.

a) *Provide* –shall mean all costs to cover purchase of materials in good condition, services for transaction with supplier, supervision, and transport to site or works all charges for rental, consumptions, overheads and profits throughout the Contract. It shall also include for all maintenance, insurance, handling and storage whenever applicable.

b) *Excavate for*- shall mean handling of any material from its incumbent position intended for specified work shown in the drawings or directed by the Engineer and backfilling and compacting part of material after laying of pipes, and cart away remaining to tips to be provided by the Contractor. The cost for this work shall include all survey, supervision, labour, tools machinery, protection of work, pumping, insurances and overheads and profits.

c) *'Laying'*- shall cover all work necessary for placing an object or materials to true line and level and level specified in a drawing or as directed by the Engineer.

d) *'Jointing'*- shall mean process of fixing specified material, pipes, fittings and specials together using appropriate tools, materials, labour and machinery. It should cover for all work necessary to provide matching of opposite parts in size, shape, and position indicated and clamps, settings and holders to hold firmly.

e) *'Testing'*-shall mean provision of all materials, apparatus, labour, machinery, charges for the media or chemical to be used and their transport, repair of object to be tested if required, re-testing, excavation of any part for visual inspection, erection of any type all until the object has been certified as having passed the required test satisfactorily.

f) *'Install'*-shall include for all work requirements stipulated for "laying and jointing"

38. <u>Government Taxes</u>

Tenderers to include in their rates for 16% V.A.T., all duties and other statutory taxes as no claim on the same shall be allowed.

a) Tenderers should note that the Employer will deduct 3% of the contract being withholding tax and will be remitted directly to the commissioner of Income Tax.

39. <u>Pricing of Preliminaries Items.</u>

Prices will be inserted against item of preliminaries in the contractor's Bills of Quantities and specification. Where the contractor fails to insert his price in any item he shall be deemed to have made adequate provision for this on various items in the Bills of Quantities. The preliminaries form part of this contract and together with other Bills of Quantities covers for the costs involved in complying with all the requirements for the proper
execution of the whole of the works in the contract.

40. <u>Statement of Compliance</u>

a) I confirm compliance of all clauses of the General Conditions, General Specifications and Particular Specifications in this tender.

b) I confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

Signed: ……. *for and on behalf of the Tenderer*

Date: .....…….

Official Rubber Stamp: ……

BILLS OF QUANTITIES

Item No		Unit	Qty	Rate	Amount
	ELEMENTNO.1				
	SUBSTRUCTURES				
	EXCAVATIONS				
	Excavations including maintaining and supporting sides and keeping free from water, mudand fallen material				
A	Excavate average 200mm deep to remove top soil and dispose as directed as directed on site	SM	13		
B	Excavate for Column bases starting from stripped level not exceeding 1.5m deep	CM	72		
C	Ditto for pits from reduced level over 1.50 metres but not exceeding 3.00m deep including planking and strutting to sides of excavations	CM	72		
D	Extra over excavations for excavating in rock; class 1	CM	5		
	KeepingExcavationsfreeofwater				
E	Allow for keeping excavations free of water and pumping, bailing or any other approved means	ITEM			
F	Allow for planking and strutting	ITEM			
	FillingandDisposal				
G	Return, fill and ram selected excavated material around foundations	CM	100		
H	Load, wheel and deposit surplus excavated material where directed on site as directed by Project Manager	CM	42		
	MassConcrete1:4:8asdescribedin				
J	Blinding	SM	64		
	Insitu Vibrated Reinforced concrete Grade 25 (20mmaggregate)as described in:-				
K	Foundation Bases	CM	35		
L	Column	CM	12		
	Carried to Collection				

Item No		Unit	Qty	Rate	Amount
	Reinforcement				
	High yield Ribbed bar reinforcement to BS 4449 including bends, hooks, binding wire, distance blocks andspacer ssupportinginallposition.				
B	20mm Diameter bars	KG	1137		
C	16mm Diameter bars	KG	2781		
E	8mm Diameter bars	KG	200		
	Sawnformworkto: -				
F	Vertical sides of column bases	SM	70		
G	Vertical sides of column	SM	82		
	Carried to				
	COLLECTION				
1	Total Carried from Page 1				
2	Total Carried from above				
	SUBSRUCTURES **Carried to Grand Summary**				

Item No		Unit	Qty	Rate	Amount
	ELEMENTNO.2 SKELETALSTEELSTRUCTURE **All structural steel shall be fabricated to the specifications of 1973 and the rates to include for all materials, labour stiffeners, welding, cutting, shaping, drilling all gussets plates fastening and connection.** **Bridge structure members** **Steel trusses fabricated forming modular units to make up to 10m span hoisted approximately 4.5metres above the road** **Safety Cage; Top and Bottom Members**				
A	Fabricate and assemble in 100x100x4mm SHS including welding and bolting. **Safety Cage; Diagonal Members**	LM	120		
B	Fabricate and assemble in 50x50x4mm SHS including welding and bolting. **Safety Cage; Vertical Members**	LM	152		
C	Fabricate and assemble in 75x75x6mm L section including welding and bolting.	KG	398		
D	Fabricate and assemble in 50x50x4mm SHS including welding and bolting. **Safety Cage; Lateral Members**	LM	490		
E	Fabricate and assemble in 50x50x6mm L section including welding and bolting.	KG	240		
	Carried Forward to Collection				

Item No		Unit	Qty	Rate	Amount
	DeckLevelWindBracing				
A	Fabricate and assemble in 50x50x4mm SHS including welding and bolting.	LM	88		
	DeckCrossBearers				
B	Fabricate and assemble in 100x50x4mm RHS including welding and bolting at 1500mm centres	LM	78		
C	Fabricate and assemble in 203x203x46kg/m UC Section	KG	2584		
	Fabricate and assemble in 203x203x46kg/m UB Section	KG	2262		
	Bolts				
D	Holding down bolts;20mm Diameter including head nuts and washers grade 46 and 250mm long embedded in concrete	NO	96		
	Plates				
	The following are MS Plates to be used in membersConnections:				
E	500x500x18mm anchor plate complete with bolt holes	NO	24		
	Decking				
F	6mm thick chequered plate with and 2No. 12mm drain holes at 1200mm centres	SM	109		
G	Prepare and apply one primer coat and two coats of gloss oil paint to general surface of metal.	SM	276		
H	Supply and fix heavy Gauge expanded metal mesh on both sides of the bridge; 1.5m high	SM	120		
	Carried to				
	COLLECTION				
1	Total Carried from Page 3				
2	Total Carried From above				
	SKELETAL STEEL STRUCTURE **Carried to Grand Summary**				

Section No	Description	Unit	Qty	Rate	Amount
	GRANDSUMMARY				
1	SUBSTRUCTURES				
2	SKELETAL STEEL STRUCTURE				
	SUBTOTAL 1				
3	**ADD**: PRELIMINARIES @ 3% OF BUILDERS WORK				
	SUBTOTAL 2				
4	**ADD:** 14% VAT				
	GRAND TOTAL INCLUSIVE OF VAT Carried to Form of Tender				

PROPOSED FOOT BRIDGE FOR KyU