



Kenya National Highways Authority

Quality Highways, Better Connections

TENDER No. KeNHA/2988/2026

**REHABILITATION OF AMALA RIVER – BOMET – KAPLONG
(B7) ROAD**

(Reserved for All)

JUNE 2026

**DIRECTOR (MAINTENANCE)
KENYA NATIONAL HIGHWAYS
AUTHORITY
P.O. BOX 49712-00100
NAIROBI**

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SECTION I

INVITATION TO TENDER

SECTION 1: INVITATION TO TENDER

TENDER NO. KeNHA/2988/2026 – REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD

The Kenya National Highways Authority (KeNHA) is a State Corporation established under the Kenya Roads Act, 2007, with the responsibility for the management, development, rehabilitation and maintenance of national roads.

The Authority invites bids from eligible construction companies registered with the **National Construction Authority (NCA) in Category 1** or equivalent for foreign contractors (however the successful tenderer shall register with the NCA before the signing of the contract) for the **REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD** to be funded through the Government of Kenya Development Fund.

SCOPE OF WORK

The scope of works shall be as described in the tender document.

QUALIFICATION FOR TENDERING

Mandatory Requirements

The following **MUST** be submitted together with the bid;

- a) Copy of Certificate of Incorporation or Certificate of Compliance for Foreign Contractors.
- b) Copy of Valid Annual Practicing Licence with the National Construction Authority in the class specified above for Citizen Contractors.
- c) Copy of Valid Tax Compliance Certificate
- d) Copy of a recent CR12 form (or its equivalent for international firms) issued by the Registrar of Companies, showing the list of directors and ownership structure. *The CR12 form must be dated not earlier than six (6) months from the bid submission deadline.*
- e) Bidders must sequentially serialize all pages for each bid document submitted (including cover page). *A Guide on serialization is outlined in the Notes below*
- f) The Tender Security (of the Amount indicated in the Tender Document) shall be required in the form of Unconditional Bank Guarantee from a reputable bank in Kenya as prescribed format in the tender document.

Other Requirements

As specified in the tender documents, covering the following: -

1. **Similar previous experience.**
2. **Equipment holding.**
3. **Professional and technical personnel.**
4. **Current work load, Litigation history and Current Sworn Affidavit** (i.e. dated within three months of the tender opening date)
5. **Eligibility**
 - a. Director (s) bidding under different companies for the same tender shall be disqualified
 - b. Director (s) bidding under different companies should not participate in more than Two (2) tenders
 - c. Only those bidders registered in the **NCA 1 category** (as indicated in the tender document) shall bid as a **Single Domestic bidder** or its equivalent in case of Foreign Contractors.

- d. Bidders to comply with Section 157 of the Public Procurement and Asset Disposal Act, 2015 (PPADA, 2015) on participation of candidates in preference and reservations
- e. Bidders with history of **Non-performance** (e.g., failure to complete the projects in the last three (3)) will be disqualified.
- f. For **Joint Ventures (JV)**, evidence of a duly executed **Joint Venture Agreement** by all parties, clearly stating obligations and liabilities, must be submitted.

6. Additional Notes

i. Joint Ventures (JV)

- In the case of a JV, all mandatory requirements must be met by **all JV partners**.
- For domestic JV partners, the NCA category requirements shall be **NCA 1**.
- JV partners shall provide an executable JV agreement with parties nominating a Contractor's Representative. The agreement shall also include clear dispute resolution mechanisms.

ii. Procurement Method:

- Open tender.

iii. Document Verification

- All submitted documents may be verified with the issuing agencies to confirm their authenticity.
- **KeNHA reserves the right to verify all submitted documents.**

iv. Canvassing

- Any form of canvassing will lead to **disqualification**

There shall be a **mandatory pre-tender site visits** as specified in the detailed tender notice as uploaded onto the KeNHA website.

NOTE:

Every Bidder shall be represented by one Technical Person with a Minimum qualification of a B.Sc./B.Tech. in Civil/Highway Engineering. The Individual SHALL bring along the following in hard copies:

1. Original ID/Passport and a **CERTIFIED** Copy
 2. **CERTIFIED** copy of Degree Certificate
 3. **CERTIFIED** Copy of Registration Certificate and proof of current subscription by Engineers Board of Kenya (EBK) / Institute of Engineers of Kenya (IEK)
 4. Original Introductory letter bearing the Company letterhead and an Official Stamp authorizing them to represent them in the specific pre-tender site visit/Pre-Tender Conference. The letter shall be duly signed. Photocopies or any other media shall not be accepted.
- The copies of ID/Passport, Academic Certificates, Professional Registration Certificate, proof of current subscription **SHALL** be certified by commissioner of oaths or Notaries public
 - All the above documents shall be retained by the Procuring Entity's and may be verified later for authenticity.

One (1) person shall only represent one (1) company per Tender.

The detailed tender notice is available in the KeNHA website and Public Procurement Information Portal (PPIP). Clarifications and Questions may be sent to procurement@kenha.co.ke as indicated in the Tender Notice.

NOTE:

1. Every bidder shall make their own arrangements to familiarize themselves with the site conditions and the Road and its features.
2. **Clarity on Serialization of Tender Documents by Prospective Bidders**

Please note that all pages of the tender documents submitted by bidders shall be sequentially serialized numerically that is; 1,2,3,4,5...etc. The serialization shall be undertaken by the bidder, by doing fresh numbering on its documents. The pagination of the tender documents as downloaded from the KeNHA

website should not be used as a means of Serialization. The bidder's serialization should follow the same logical sequence from the first page to the end.

Interested eligible candidates may obtain further information and inspect tender documents from the **Kenya National Highways Authority Headquarters, Barabara Plaza as indicated in the detailed Tender Notice**, during normal working hours.

A complete set of tender documents may be obtained by interested tenderers from the Kenya National Highways Authority website: www.kenha.co.ke or PPIP portal: www.tenders.go.ke free of charge. Bidders are encouraged to download tender documents to minimise physical visits to **KeNHA Headquarters Office**.

Completed tender documents are to be enclosed in plain sealed envelope clearly marked with tender name, reference number and submitted to: -

**The Deputy Director, Supply Chain Management
Kenya National Highways Authority
Barabara Plaza,
Jomo Kenyatta International Airport (JKIA), Nairobi,
Off Mazao Road,
Block C - 2nd Floor Board Room**

or

deposited in the Tender Box at the reception area, **KeNHA - Block C - 2nd Floor Board Room** so as to be received on or before **the date and time indicated in the detailed Tender Notice**.

All interested bidders are required to continually check the Kenya National Highways Authority website: www.kenha.co.ke for any tender addendum/addenda or clarifications that may arise before submission date.

Tenders will be opened immediately thereafter in the presence of Tenderers/Representatives who wish to attend at the **Kenya National Highways Authority Headquarters, Barabara Plaza, Jomo Kenyatta International Airport (JKIA), Nairobi, Off Mazao Road, Block C - 2nd Floor Board Room**.

**Deputy Director, Supply Chain Management
For: DIRECTOR GENERAL**

PART 1 TENDERING PROCEDURES

SECTION II - INSTRUCTIONS TO TENDERERS

A. GENERAL PROVISIONS

1. Scope of Tender

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

2. Fraud and Corruption

- 2.1 The Procuring Entity requires compliance with the provisions of the Public Procurement and Asset Disposal Act, 2015, Section 62 “Declaration not to engage in corruption”. The tender submitted by a person shall include a declaration that the person shall not engage in any corrupt or fraudulent practice and a declaration that the person or his or her sub-contractors are not debarred from participating in public procurement proceedings.
- 2.2 The Procuring Entity requires compliance with the provisions of the Competition Act 2010, regarding collusive practices in contracting. Any tenderer found to have engaged in collusive conduct shall be disqualified and criminal and/or civil sanctions may be imposed. To this effect, Tenders shall be required to complete and sign the “Certificate of Independent Tender Determination” annexed to the Form of Tender.
- 2.3 Tenderers shall permit and shall cause their agents (where declared or not), subcontractors, sub-consultants, service providers, suppliers, and their personnel, to permit the Procuring Entity to inspect all accounts, records and other documents relating to any initial selection process, pre-qualification process, tender submission, proposal submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the Procuring Entity.
- 2.4 Unfair Competitive Advantage -Fairness and transparency in the tender process require that the firms or their Affiliates competing for a specific assignment do not derive a competitive advantage from having provided consulting services related to this tender. To that end, the Procuring Entity shall indicate in the **Data Sheet** and make available to all the firms together with this tender document all information that would in that respect give such firm any unfair competitive advantage over competing firms.

3. Eligible Tenderers

- 3.1 A Tenderer may be a firm that is a private entity, a state-owned enterprise or institution subject to ITT 3.8, or an individual or any combination of such entities in the form of a joint venture (JV) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the tendering process and, in the event the JV is awarded the Contract, during contract execution. Members of a joint venture may not also make an individual tender, be a subcontractor in a separate tender or be part of another joint venture for the purposes of the same Tender. The maximum number of JV members shall be specified in the **TDS**.
- 3.2 Public Officers of the Procuring Entity, their Spouses, Child, Parent, Brothers or Sister. Child, Parent, Brother or Sister of a Spouse, their business associates or agents and firms/organizations in which they have a substantial or controlling interest shall not be eligible to tender or be awarded a contract. Public Officers are also not allowed to participate in any procurement proceedings.
- 3.3 A Tenderer shall not have a conflict of interest. Any tenderer found to have a conflict of interest shall be disqualified. A tenderer may be considered to have a conflict of interest for the purpose of this tendering process, if the tenderer:
 - a) Directly or indirectly controls, is controlled by or is under common control with another tenderer; or
 - b) Receives or has received any direct or indirect subsidy from another tenderer; or

- c) Has the same legal representative as another tenderer; or
 - d) Has a relationship with another tenderer, directly or through common third parties, that puts it in a position to influence the tender of another tenderer, or influence the decisions of the Procuring Entity regarding this tendering process; or
 - e) Any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the goods or works that are the subject of the tender; or
 - f) any of its affiliates has been hired (or is proposed to be hired) by the Procuring Entity as a consultant for Contract implementation; or
 - g) Would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the contract specified in this Tender Document; or
 - h) Has a close business or personal relationship with senior management or professional staff of the Procuring Entity who has the ability to influence the bidding process and:
 - i) are directly or indirectly involved in the preparation of the Tender document or specifications of the Contract, and/or the Tender evaluation process of such contract; or
 - ii) May be involved in the implementation or supervision of such Contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Procuring Entity throughout the tendering process and execution of the Contract.
- 3.4 A tenderer shall not be involved in corrupt, coercive, obstructive or fraudulent practice. A tenderer that is proven to have been involved in any of these practices shall be automatically disqualified.
- 3.5 A Tenderer (either individually or as a JV member) shall not participate in more than one Tender, except for permitted alternative tenders. This includes participation as a subcontractor in other Tenders. Such participation shall result in the disqualification of all Tenders in which the firm is involved. Members of a joint venture may not also make an individual tender, be a subcontractor in a separate tender or be part of another joint venture for the purposes of the same Tender. A firm that is not a tenderer or a JV member may participate as a subcontractor in more than one tender.
- 3.6 A Tenderer may have the nationality of any country, subject to the restrictions pursuant to ITT3.9. A Tenderer shall be deemed to have the nationality of a country if the Tenderer is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or sub-consultants for any part of the Contract including related Services.
- 3.7 A Tenderer that has been debarred from participating in public procurement shall be ineligible to tender or be awarded a contract. The list of debarred firms and individuals is available from the website of PPRA www.ppra.go.ke.
- 3.8 A Tenderer that is a state-owned enterprise or a public institution in Kenya may be eligible to tender and be awarded a Contract(s) only if it is determined by the Procuring Entity to meet the following conditions, i.e. if it is:
- i) A legal public entity of Government and/or public administration,
 - ii) financially autonomous and not receiving any significant subsidies or budget support from any public entity or Government, and
 - iii) Operating under commercial law and vested with legal rights and liabilities similar to any commercial enterprise to enable it compete with firms in the private sector on an equal basis.
- 3.9 Firms and individuals shall be ineligible if their countries of origin are:
- a) as a matter of law or official regulations, Kenya prohibits commercial relations with that country, or

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

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

- 3.10 Foreign tenderers are required to source at least forty (40%) percent of their contract inputs (in supplies, local subcontracts and labor) from citizen suppliers and contractors. To this end, a foreign tenderer shall provide in its tender documentary evidence that this requirement is met. Foreign tenderers not meeting this criterion will be automatically disqualified. Information required to enable the Procuring Entity determine if this condition is met shall be provided for this purpose in “*SECTION III-EVALUATION AND QUALIFICATION CRITERIA, Item 9*”.
- 3.11 Pursuant to the eligibility requirements of ITT4.10, a tender is considered a foreign tenderer, if the tenderer is not registered in Kenya or if the tenderer is registered in Kenya and has less than 51 percent ownership by Kenyan citizens. JVs are considered as foreign tenderers if the individual member firms are not registered in Kenya or if are registered in Kenya and have less than 51 percent ownership by Kenyan citizens. The JV shall not subcontract to foreign firms more than 10 percent of the contract price, excluding provisional sums.
- 3.12 The National Construction Authority Act of Kenya requires that all local and foreign contractors be registered with the National Construction Authority and be issued with a Registration Certificate before they can undertake any construction works in Kenya. Registration shall not be a condition for tender, but it shall be a condition of contract award and signature. A selected tenderer shall be given opportunity to register before such award and signature of contract. Application for registration with National Construction Authority may be accessed from the website www.nca.go.ke.
- 3.13 The Competition Act of Kenya requires that firms wishing to tender as Joint Venture undertakings which may prevent, distort or lessen competition in provision of services are prohibited unless they are exempt in accordance with the provisions of Section 25 of the Competition Act, 2010. JVs will be required to seek for exemption from the Competition Authority. Exemption shall not be a condition for tender, but it shall be a condition of contract award and signature. A JV tenderer shall be given opportunity to seek such exemption as a condition of award and signature of contract. Application for exemption from the Competition Authority of Kenya may be accessed from the website www.cak.go.ke.
- 3.14 A Kenyan tenderer shall be eligible to tender if it provides evidence of having fulfilled his/her tax obligations by producing a valid tax compliance or valid tax certificate issued by the Kenya Revenue Authority.

4. Eligible Goods, Equipment, and Services

- 4.1 Goods, equipment and services to be supplied under the Contract may have their origin in any country that is not ineligible under ITT3.9. At the Procuring Entity's request, Tenderers may be required to provide evidence of the origin of Goods, equipment and services.
- 4.2 Any goods, works and production processes with characteristics that have been declared by the relevant national environmental protection agency or by other competent authority as harmful to human beings and to the environment shall not be eligible for procurement.

5. Tenderer's Responsibilities

- 5.1 The tenderer shall bear all costs associated with the preparation and submission of his/her tender, and the Procuring Entity will in no case be responsible or liable for those costs.
- 5.2 The tenderer, at the tenderer's own responsibility and risk, is encouraged to visit and examine and inspect the Site of the Works and its surroundings and obtain all information that may be necessary for preparing the tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the tenderer's own expense.

- 53 The Tenderer and any of its personnel or agents will be granted permission by the Procuring Entity to enter up on its premises and lands for the purpose of such visit. The Tenderer shall indemnify the Procuring Entity against all liability arising from death or personal injury, loss of or damage to property, and any other losses and expenses incurred as a result of the examination and inspection.
- 54 The tenderer shall provide in the Form of Tender and Qualification Information, a preliminary description of the proposed work method and schedule, including charts, as necessary or required.

B. CONTENTS OF TENDER DOCUMENTS

6. Sections of Tender Document

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

PART 1: Tendering Procedures

Section I: Instructions to Tenderers

Section II: Tender Data Sheet (TDS)

Section III: Evaluation and Qualification Criteria

Section IV: Tendering Forms

PART 2: Works' Requirements

Section V: Bills of Quantities

Section VI: Specifications Section

VII: Drawings

PART3: Conditions of Contract and Contract Forms

Section VIII: General Conditions (GCC)

Section IX: Particular Conditions of Contract

Section X: Contract Forms

- 62 The Invitation to Tender Notice issued by the Procuring Entity is not part of the Contract documents.
- 63 Unless obtained directly from the Procuring Entity, the Procuring Entity is not responsible for the completeness of the Tender document, responses to requests for clarification, the minutes of a pre-arranged site visit and those of the pre-Tender meeting (if any), or Addenda to the Tender document in accordance with ITT 10. In case of any contradiction, documents obtained directly from the Procuring Entity shall prevail.
- 64 The Tenderer is expected to examine all instructions, forms, terms, and specifications in the Tender Document and to furnish with its Tender all information and documentation as is required by the Tender document.

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

- 7.1 Tenderer requiring any clarification of the Tender Document shall contact the Procuring Entity in writing at the Procuring Entity's address **specified in the TDS** or raise its enquiries during the pre-Tender meeting if provided for in accordance with ITT 7.2. The Procuring Entity will respond in writing to any request for clarification, provided that such request is received no later than the period specified in the **TDS** prior to the deadline for submission of tenders. The Procuring Entity shall forward copies of its response to all tenderers who have acquired the Tender D documents in accordance with ITT 7.4, including a description of the inquiry but without identifying its source. If so specified **in the TDS**, the Procuring Entity shall also promptly publish its response at the web page identified in the **TDS**. Should the clarification result in changes to the essential elements of the Tender Documents, the Procuring Entity shall amend the Tender Documents following the procedure under ITT 8 and ITT

22.2.

- 72 The Tenderer, at the Tenderer's own responsibility and risk, is encouraged to visit and examine and inspect the site(s) of the required contracts and obtain all information that may be necessary for preparing a tender. The costs of visiting the Site shall be at the Tenderer's own expense. The Procuring Entity shall specify in the **TDS** if a pre- arranged Site visit and or a pre-tender meeting will be held, when and where. The Tenderer's designated representative is invited to attend a pre-arranged site visit and a pre-tender meeting, as the case may be. The purpose of the site visit and the pre-tender meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 73 The Tenderer is requested to submit any questions in writing, to reach the Procuring Entity not later than the period specified in the **TDS** before the meeting.
- 74 Minutes of a pre-arranged site visit and those of the pre-tender meeting, if applicable, including the text of the questions asked by Tenderers and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Tenderers who have acquired the Tender Documents. Minutes shall not identify the source of the questions asked.
- 75 The Procuring Entity shall also promptly publish anonymized (*no names*) Minutes of the pre-arranged site visit and those of the pre-tender meeting at the web page identified **in the TDS**. Any modification to the Tender Documents that may become necessary as a result of the pre-arranged site visit and those of the pre-tender meeting shall be made by the Procuring Entity exclusively through the issue of an Addendum pursuant to ITT 8 and not through the minutes of the pre-Tender meeting. Non-attendance at the pre-arranged site visit and the pre-tender meeting will not be a cause for disqualification of a Tenderer.

8. Amendment of Tender Documents

- 8.1 At any time prior to the deadline for submission of Tenders, the Procuring Entity may amend the Tender Documents by issuing addenda.
- 8.2 Any addendum issued shall be part of the Tender Documents and shall be communicated in writing to all who have obtained the Tender Documents from the Procuring Entity. The Procuring Entity shall also promptly publish the addendum on the Procuring Entity's website in accordance with ITT 7.5.
- 8.3 To give Tenderers reasonable time in which to take an addendum into account in preparing their Tenders, the Procuring Entity should extend the deadline for the submission of Tenders, pursuant to ITT 22.2.

C. PREPARATION OF TENDERS

9. Cost of Tendering

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

10. Language of Tender

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

11. Documents Comprising the Tender

11.1 The Tender shall comprise the following:

- a) Form of Tender prepared in accordance with ITT 12;
- b) Schedules including priced Bill of Quantities, completed in accordance with ITT 12 and ITT 14;
- c) Tender Security or Tender-Securing Declaration, in accordance with ITT 19.1;

- d) Alternative Tender, if permissible, in accordance with ITT 13;
 - e) Authorization: written confirmation authorizing the signatory of the Tender to commit the Tenderer, in accordance with ITT 20.3;
 - f) Qualifications: documentary evidence in accordance with ITT 17 establishing the Tenderer's qualifications to perform the Contract if its Tender is accepted;
 - g) Conformity: a technical proposal in accordance with ITT 16;
 - h) Any other document required in the TDS.
- 11.2 In addition to the requirements under ITT 11.1, Tenders submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful Tender shall be signed by all members and submitted with the Tender, together with a copy of the proposed JV Agreement. Change of membership and conditions of the JV prior to contract signature will render the tender liable for disqualification.

12. Form of Tender and Schedules

- 12.1 The Form of Tender and Schedules, including the Bill of Quantities, shall be prepared using the relevant forms furnished in Section IV, Tendering Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITT 20.3. All blank spaces shall be filled in with the information requested. The Tenderer shall chronologically serialize all pages of the tender documents submitted.
- 12.2 The Tenderer shall furnish in the Form of Tender information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Tender.

13. Alternative Tenders

- 13.1 Unless otherwise specified in the TDS, alternative Tenders shall not be considered.
- 13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the **TDS**, and the method of evaluating different alternative times for completion will be described in Section III, Evaluation and Qualification Criteria.
- 13.3 Except as provided under ITT13.4 below, Tenderers wishing to offer technical alternatives to the requirements of the Tender Documents must first price the Procuring Entity's design as described in the Tender Documents and shall further provide all information necessary for a complete evaluation of the alternative by the Procuring Entity, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the Tenderer with the Winning Tender conforming to the basic technical requirements shall be considered by the Procuring Entity.
- 13.4 When specified in the **TDS**, Tenderers are permitted to submit alternative technical solutions for specified parts of the Works, and such parts will be identified in the **TDS**, as will the method for their evaluating, and described in Section VII, Works' Requirements.

14. Tender Prices and Discounts

- 14.1 The prices and discounts (including any price reduction) quoted by the Tenderer in the Form of Tender and in the Bill of Quantities shall conform to the requirements specified below.
- 14.2 The Tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Tenderer shall be deemed covered by the rates for other items in the Bill of Quantities and will not be paid for separately by the Procuring Entity. An item not listed in the priced Bill of Quantities shall be assumed to be not included in the Tender, and provided that the Tender is determined substantially responsive notwithstanding this omission, the average price of the item quoted by substantially responsive Tenderers will be added to the Tender price and the equivalent total cost of the Tender so determined will be used for price comparison.
- 14.3 The price to be quoted in the Form of Tender, in accordance with ITT 12, shall be the total price of the Tender, including any discounts offered.

- 14.4 The Tenderer shall quote any discounts and the methodology for their application in the Form of Tender, in accordance with ITT 12
- 14.5 It will be specified in the **TDS** if the rates and prices quoted by the Tenderer are or are not subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract, excepting cases where the contract is subject to fluctuations and adjustments, not fixed price. In such a case, the Tenderer shall furnish the indices and weightings for the price adjustment formulae in the Schedule of Adjustment Data and the Procuring Entity may require the Tenderer to justify its proposed indices and weightings.
- 14.6 Where tenders are being invited for individual lots (contracts) or for any combination of lots (packages), tenderers wishing to offer discounts for the award of more than one Contract shall specify in their Tender the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Discounts shall be submitted in accordance with ITT 14.4, provided the Tenders for all lots (contracts) are opened at the same time.
- 14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 30 days prior to the deadline for submission of Tenders, shall be included in the rates and prices and the total Tender Price submitted by the Tenderer.

15. Currencies of Tender and Payment

- 15.1 The currency (ies) of the Tender and the currency (ies) of payments shall be the same.
- 15.2 Tenderers shall quote entirely in Kenya Shillings. The unit rates and the prices shall be quoted by the Tenderer in the Bill of Quantities, entirely in Kenya shillings
- a) A Tenderer expecting to incur expenditures in other currencies for inputs to the Works supplied from outside Kenya (referred to as “the foreign currency requirements”) shall (if so allowed in the **TDS**) indicate in the Appendix to Tender the percentage(s) of the Tender Price (excluding Provisional Sums), needed by the Tenderer for the payment of such foreign currency requirements, limited to no more than two foreign currencies.
 - b) The rates of exchange to be used by the Tenderer in arriving at the local currency equivalent and the percentage(s) mentioned in (a) above shall be specified by the Tenderer in the Appendix to Tender and shall be based on the exchange rate provided by the Central Bank of Kenya on the date 30 days prior to the actual date of tender opening. Such exchange rate shall apply for all foreign payments under the Contract.
- 15.3 Tenderers may be required by the Procuring Entity to justify, to the Procuring Entity's satisfaction, their local and foreign currency requirements, and to substantiate that the amounts included in the unit rates and prices and shown in the Schedule of Adjustment Data in the Appendix to Tender are reasonable, in which case a detailed breakdown of the foreign currency requirements shall be provided by Tenderers.

16. Documents Comprising the Technical Proposal

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

17. Documents Establishing the Eligibility and Qualifications of the Tenderer

- 17.1 Tenderers shall complete the Form of Tender, included in Section IV, Tender Forms, to establish Tenderer's eligibility in accordance with ITT 4.
- 17.2 In accordance with Section III, Evaluation and Qualification Criteria, to establish its qualifications to perform the Contract the Tenderer shall provide the information requested in the corresponding information sheets included in Section IV, Tender Forms.
- 17.3 If a margin of preference applies as specified in accordance with ITT33. 1, national tenderers,

individually or in joint ventures, applying for eligibility for national preference shall supply all information required to satisfy the criteria for eligibility specified in accordance with ITT 33.1.

- 17.4 Tenderers shall be asked to provide, as part of the data for qualification, such information, including details of ownership, as shall be required to determine whether, according to the classification established by the Procuring Entity, a particular contract or group of contractors qualifies for a margin of preference. Further the information will enable the Procuring Entity identify any actual or potential conflict of interest in relation to the procurement and/or contract management processes, or possibility of collusion between tenderers, and there by help to prevent any corrupt influence in relation to the procurement process or contract management.
- 17.5 The purpose of the information described in ITT 17.2 above overrides any claims to confidentiality which a tenderer may have. There can be no circumstances in which it would be justified for a tenderer to keep information relating to its ownership and control confidential where it is tendering to undertake public sector work and receive public sector funds. Thus, confidentiality will not be accepted by the Procuring Entity as a justification for a Tenderer's failure to disclose, or failure to provide required information on its ownership and control.
- 17.6 The Tenderer shall provide further documentary proof, information or authorizations that the Procuring Entity may request in relation to ownership and control which information on any changes to the information which was provided by the tenderer under ITT 6.4. The obligations to require this information shall continue for the duration of the procurement process and contract performance and after completion of the contract, if any change to the information previously provided may reveal a conflict of interest in relation to the award or management of the contract.
- 17.7 All information provided by the tenderer pursuant to these requirements must be complete, current and accurate as at the date of provision to the Procuring Entity. In submitting the information required pursuant to these requirements, the Tenderer shall warrant that the information submitted is complete, current and accurate as at the date of submission to the Procuring Entity.
- 17.8 If a tenderer fails to submit the information required by these requirements, its tenderer will be rejected. Similarly, if the Procuring Entity is unable, after taking reasonable steps, to verify to a reasonable degree the information submitted by a tenderer pursuant to these requirements, then the tender will be rejected.
- 17.9 If information submitted by a tenderer pursuant to these requirements, or obtained by the Procuring Entity (whether through its own enquiries, through notification by the public or otherwise), shows any conflict of interest which could materially and improperly benefit the tenderer in relation to the procurement or contract management process, then:
- i) If the procurement process is still on going, the tenderer will be disqualified from the procurement process,
 - ii) If the contract has been awarded to that tenderer, the contract award will be set aside,
 - iii) the tenderer will be referred to the relevant law enforcement authorities for investigation of whether the tenderer or any other persons have committed any criminal offence.
- 17.10 If a tenderer submits information pursuant to these requirements that is incomplete, inaccurate or out-of-date, or attempts to obstruct the verification process, then the consequences ITT 17.8 will ensue unless the tenderer can show to the reasonable satisfaction of the Procuring Entity that any such act was not material, or was due to genuine error which was not attributable to the intentional act, negligence or recklessness of the tender.

18. Period of Validity of Tenders

- 18.1.** Tenders shall remain valid for the Tender Validity period specified in the TDS. The Tender Validity period starts from the date fixed for the Tender submission deadline (as prescribed by the Procuring Entity in accordance with ITT 22). A Tender valid for a shorter period shall be rejected by the Procuring Entity as non-responsive.

18.2 In exceptional circumstances, prior to the expiration of the Tender validity period, the Procuring Entity may request Tenderers to extend the period of validity of their Tenders. The request and the responses shall be made in writing. If a Tender Security is requested in accordance with ITT 19, it shall also be extended for thirty (30) days beyond the deadline of the extended validity period. A Tenderer may refuse the request without forfeiting its Tender security. A Tenderer granting their quest shall not be required or permitted to modify its Tender.

19. Tender Security

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

19.2 If a Tender Security is specified pursuant to ITT 19.1, the Tender Security shall be a demand guarantee in any of the following forms at the Tenderer's option:

- i) cash;
- ii) a bank guarantee;
- iii) a guarantee by an insurance company registered and licensed by the Insurance Regulatory Authority listed by the Authority; or
- iv) a guarantee issued by a financial institution approved and licensed by the Central Bank of Kenya, from a reputable source, and an eligible country.

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

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

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

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

19.7 The Tender Security may be forfeited or the Tender-Securing Declaration executed:

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

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

19.9 The Tender Security or the Tender-Securing Declaration of a JV shall be in the name of the JV that submits the Tender. If the JV has not been legally constituted into a legally enforceable JV at the time

of tendering, the Tender Security or the Tender-Securing Declaration shall be in the names of all future members as named in the letter of intent referred to in ITT 4.1 and ITT 11.2.

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

20. Format and Signing of Tender

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

D. SUBMISSION AND OPENING OF TENDERS

21. Sealing and Marking of Tenders

- 21.1 The Tenderer shall deliver the Tender in a single sealed envelope, or in a single sealed package, or in a single sealed container bearing the name and Reference number of the Tender, addressed to the Procuring Entity and a warning not to open before the time and date for Tender opening date. Within the single envelope, package or container, the Tenderer shall place the following separate, sealed envelopes:
- a) in an envelope or package or container marked “ORIGINAL”, all documents comprising the Tender, as described in ITT 11; and
 - b) in an envelope or package or container marked “COPIES” all required copies of the Tender; and
 - c) if alternative Tenders are permitted in accordance with ITT 13, and if relevant:
 - i) in an envelope or package or container marked “ORIGINAL - ALTERNATIVE TENDER”, the alternative Tender; and
 - ii) in the envelope or package or container marked “COPIES-ALTERNATIVE TENDER”, all required copies of the alternative Tender.

The inner envelopes or packages or containers shall:

- a) bear the name and address of the Procuring Entity.
 - b) Bear the name and address of the Tenderer; and
 - c) Bear the name and Reference number of the Tender.
- 21.2 If an envelope or package or container is not sealed and marked as required, the *Procuring Entity* will assume no responsibility for the misplacement or premature opening of the Tender. Tenders that were

misplaced or opened prematurely will not be accepted.

22. Deadline for Submission of Tenders

- 22.1 Tenders must be received by the Procuring Entity at the address specified in the **TDS** and no later than the date and time also specified in the **TDS**. When so specified in the **TDS**, Tenderers shall have the option of submitting their Tenders electronically. Tenderers submitting Tenders electronically shall follow the electronic Tender submission procedures specified in the **TDS**.
- 22.2 The Procuring Entity may, at its discretion, extend the deadline for the submission of Tenders by amending the Tender Documents in accordance with ITT 8, in which case all rights and obligations of the Procuring Entity and Tenderers previously subject to the deadline shall thereafter be subject to the deadline as extended.

23. Late Tenders

The Procuring Entity shall not consider any Tender that arrives after the deadline for submission of tenders, in accordance with ITT 22. Any Tender received by the Procuring Entity after the deadline for submission of Tenders shall be declared late, rejected, and returned unopened to the Tenderer.

24. Withdrawal, Substitution, and Modification of Tenders

- 24.1 A Tenderer may withdraw, substitute, or modify its Tender after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITT 20.3, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Tender must accompany the respective written notice. All notices must be:
- a) prepared and submitted in accordance with ITT 20 and ITT 21 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” “MODIFICATION;” and
 - b) received by the Procuring Entity prior to the deadline prescribed for submission of Tenders, in accordance with ITT 22.
- 24.2 Tenders requested to be withdrawn in accordance with ITT 24.1 shall be returned unopened to the Tenderers.
- 24.3 No Tender may be withdrawn, substituted, or modified in the interval between the deadline for submission of Tenders and the expiration of the period of Tender validity specified by the Tenderer on the Form of Tender or any extension thereof.

25. Tender Opening

- 25.1 Except in the cases specified in ITT 23 and ITT 24.2, the Procuring Entity shall publicly open and read out all Tenders received by the deadline, at the date, time and place specified **in the TDS**, in the presence of Tenderers' designated representatives and anyone who chooses to attend. Any specific electronic Tender opening procedures required if electronic Tendering is permitted in accordance with ITT 22.1, shall be as specified in the **TDS**.
- 25.2 First, envelopes marked “WITHDRAWAL” shall be opened and read out and the envelopes with the corresponding Tender shall not be opened but returned to the Tenderer. No Tender withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at tender opening.
- 25.3 Next, envelopes marked “SUBSTITUTION” shall be opened and read out and exchanged with the corresponding Tender being substituted, and the substituted Tender shall not be opened, but returned to the Tenderer. No Tender substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Tender opening.
- 25.4 Next, envelopes marked “MODIFICATION” shall be opened and read out with the corresponding Tender No. Tender modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Tender opening.

- 25.5 Next, all remaining envelopes shall be opened on eata time, reading out: the name of the Tenderer and whether there is a modification; the total Tender Price, per lot (contract) if applicable, including any discounts and alternative Tenders; the presence or absence of a Tender Security or Tender-Securing Declaration, if required; and any other details as the Procuring Entity may consider appropriate.
- 25.6 Only Tenders, alternative Tenders and discounts that are opened and read out at Tender opening shall be considered further for evaluation. The Form of Tender and pages of the Bill of Quantities (to be decided on by the tender opening committee) are to be initialled by the members of the tender opening committee attending the opening.
- 25.7 At the Tender Opening, the Procuring Entity shall neither discuss the merits of any Tender nor reject any Tender (except for late Tenders, in accordance with ITT 23.1).
- 25.8 The Procuring Entity shall prepare minutes of the Tender Opening that shall include, as a minimum:
- a) The name of the Tenderer and whether there is a withdrawal, substitution, or modification;
 - b) The Tender Price, per lot (contract) if applicable, including any discounts;
 - c) any alternative Tenders;
 - d) the presence or absence of a Tender Security, if one was required.
 - e) number of pages of each tender document submitted.
- 25.9 The Tenderers' representatives who are present shall be requested to sign the minutes. The omission of a Tenderer's signature on the minutes shall not invalidate the contents and effect of the minutes. A copy of tender opening register shall be issued to a tenderer upon request.

E. Evaluation and Comparison of Tenders

26. Confidentiality

- 26.1 Information relating to the evaluation of Tenders and recommendation of contract award shall not be disclosed to Tenderers or any other persons not officially concerned with the Tender process until information on Intention to Award the Contract is transmitted to all Tenderers in accordance with ITT 43.
- 26.2 Any effort by a Tenderer to influence the Procuring Entity in the evaluation of the Tenders or Contract award decisions may result in the rejection of its tender.
- 26.3 Notwithstanding ITT 26.2, from the time of tender opening to the time of contract award, if a tenderer wishes to contact the Procuring Entity on any matter related to the tendering process, it shall do so in writing.

27. Clarification of Tenders

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

28. Deviations, Reservations, and Omissions

- 28.1 During the evaluation of tenders, the following definitions apply:
- a) "Deviation" is a departure from the requirements specified in the tender document;

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

29. Determination of Responsiveness

- 29.1 The Procuring Entity's determination of a Tender's responsiveness is to be based on the contents of the tender itself, as defined in ITT 11.
- 29.2 A substantially responsive Tender is one that meets the requirements of the Tender document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that, if accepted, would:
 - a) Affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
 - b) limit in any substantial way, inconsistent with the tender document, the Procuring Entity's rights or the tenderer's obligations under the proposed contract; or
 - c) if rectified, would unfairly affect the competitive position of other tenderers presenting substantially responsive tenders.
- 29.3 The Procuring Entity shall examine the technical aspects of the tender submitted in accordance with ITT 16, to confirm that all requirements of Section VII, Works' Requirements have been met without any material deviation, reservation or omission.
- 29.4 If a tender is not substantially responsive to the requirements of the tender document, it shall be rejected by the Procuring Entity and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

30. Non-material Non-conformities

- 30.1 Provided that a tender is substantially responsive, the Procuring Entity may waive any non-conformities in the tender.
- 30.2 Provided that a Tender is substantially responsive, the Procuring Entity may request that the tenderer submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial non- conformities in the tender related to documentation requirements. Requesting information or documentation on such non-conformities shall not be related to any aspect of the price of the tender. Failure of the tenderer to comply with the request may result in the rejection of its tender.
- 30.3 Provided that a tender is substantially responsive, the Procuring Entity shall rectify quantifiable nonmaterial non-conformities related to the Tender Price. To this effect, the Tender Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component in the manner specified **in the TDS**.

31. Arithmetical Errors

- 31.1 The tender sum as submitted and read out during the tender opening shall be absolute and final and shall not be the subject of correction, adjustment or amendment in anyway by any person or entity.
- 31.2 Provided that the Tender is substantially responsive, the Procuring Entity shall handle errors on the following basis:
 - a) Any error detected if considered a major deviation that affects the substance of the tender, shall lead to disqualification of the tender as non-responsive.
 - b) Any errors in the submitted tender arising from a miscalculation of unit price, quantity, sub total

and total bid price shall be considered as a major deviation that affects the substance of the tender and shall lead to disqualification of the tender as non-responsive. and

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

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

32. Conversion to Single Currency

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

33. Margin of Preference and Reservations

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

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

33.3 Contracts procured on basis of international competitive tendering shall not be subject to reservations exclusive to specific groups as provided in ITT 33.4.

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

34. Nominated Subcontractors

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

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

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

35. Evaluation of Tenders

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

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

- a) Price adjustment in accordance with ITT 31.1(iii); excluding provisional sums and contingencies, if any, but including Day work items, where priced competitively;
- b) Price adjustment due to discounts offered in accordance with ITT 14.4;
- c) converting the amount resulting from applying (a) and (b) above, if relevant, to a single currency in accordance with ITT 32;

- d) price adjustment due to quantifiable non-material non-conformities in accordance with ITT 30.3; and
 - e) any additional evaluation factors specified **in the TDS** and Section III, Evaluation and Qualification Criteria.
- 35.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be considered intender evaluation.
- 35.4 Where the tender involves multiple lots or contracts, the tenderer will be allowed to tender for one or more lots (contracts). Each lot or contract will be evaluated in accordance with ITT 35.2. The methodology to determine the lowest evaluated tenderer or tenderers based one lot (contract) or based on a combination of lots (contracts), will be specified in Section III, Evaluation and Qualification Criteria. In the case of multiple lots or contracts, tenderer will be will be required to prepare the Eligibility and Qualification Criteria Form for each Lot.

36. Comparison of Tenders

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

37. Abnormally Low Tenders and Abnormally High Tenders Abnormally Low Tenders

- 37.1 An Abnormally Low Tender is one where the Tender price, in combination with other elements of the Tender, appears so low that it raises material concerns as to the capability of the Tenderer in regards to the Tenderer's ability to perform the Contract for the offered Tender Price or that genuine competition between Tenderers is compromised.
- 37.2 In the event of identification of a potentially Abnormally Low Tender, the Procuring Entity shall seek written clarifications from the Tenderer, including detailed price analyses of its Tender price in relation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the Tender document.
- 37.3 After evaluation of the price analyses, in the event that the Procuring Entity determines that the Tenderer has failed to demonstrate its capability to perform the Contract for the offered Tender Price, the Procuring Entity shall reject the Tender.

Abnormally High Tenders

- 37.4 An abnormally high tender price is one where the tender price, in combination with other constituent elements of the Tender, appears unreasonably too high to the extent that the Procuring Entity is concerned that it (the Procuring Entity) may not be getting value for money or it may be paying too high a price for the contract compared with market prices or that genuine competition between Tenderers is compromised.
- 37.5 In case of an abnormally high price, the Procuring Entity shall make a survey of the market prices, check if the estimated cost of the contract is correct and review the Tender Documents to check if the specifications, scope of work and conditions of contract are contributory to the abnormally high tenders. The Procuring Entity may also seek written clarification from the tenderer on the reason for the high tender price. The Procuring Entity shall proceed as follows:
- i) If the tender price is abnormally high based on wrong estimated cost of the contract, the Procuring Entity may accept or not accept the tender depending on the Procuring Entity's budget considerations.
 - ii) If specifications, scope of work and/or conditions of contract are contributory to the abnormally high tender prices, the Procuring Entity shall reject all tenders and may retender for the contract based on revised estimates, specifications, scope of work and conditions of contract, as the case may be.
- 37.6 If the Procuring Entity determines that the Tender Price is abnormally too high because genuine competition between tenderers is compromised (*often due to collusion, corruption or other*

manipulations), the Procuring Entity shall reject all Tenders and shall institute or cause competent Government Agencies to institute an investigation on the cause of the compromise, before retendering.

38. Unbalanced and/or Front-Loaded Tenders

- 38.1 If in the Procuring Entity's opinion, the Tender that is evaluated as the lowest evaluated price is seriously unbalanced and/or front loaded, the Procuring Entity may require the Tenderer to provide written clarifications. Clarifications may include detailed price analyses to demonstrate the consistency of the tender prices with the scope of works, proposed methodology, schedule and any other requirements of the Tender document.
- 38.2 After the evaluation of the information and detailed price analyses presented by the Tenderer, the Procuring Entity may as appropriate:
- a) accept the Tender; or
 - b) require that the total amount of the Performance Security be increased at the expense of the Tenderer to a level not exceeding a 10% of the Contract Price; or
 - c) agree on a payment mode that eliminates the inherent risk of the Procuring Entity paying too much for undelivered works; or
 - d) reject the Tender,

39. Qualifications of the Tenderer

- 39.1 The Procuring Entity shall determine to its satisfaction whether the eligible Tenderer that is selected as having submitted the lowest evaluated cost and substantially responsive Tender, meets the qualifying criteria specified in Section III, Evaluation and Qualification Criteria.
- 39.2 The determination shall be based upon an examination of the documentary evidence of the Tenderer's qualifications submitted by the Tenderer, pursuant to ITT 17. The determination shall not take into consideration the qualifications of other firms such as the Tenderer's subsidiaries, parent entities, affiliates, subcontractors (other than Specialized Subcontractors if permitted in the Tender document), or any other firm(s) different from the Tenderer.
- 39.3 An affirmative determination shall be a prerequisite for award of the Contract to the Tenderer. A negative determination shall result in disqualification of the Tender, in which event the Procuring Entity shall proceed to the Tenderer who offers a substantially responsive Tender with the next lowest evaluated price to make a similar determination of that Tenderer's qualifications to perform satisfactorily.

40. Lowest Evaluated Tender

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

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

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

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

F. AWARD OF CONTRACT

42. Award Criteria

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

43. Notice of Intention to enter into a Contract

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

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

44. Stand still Period

- 421 The Contract shall not be signed earlier than the expiry of a Standstill Period of 14 days to allow any dissatisfied tender to launch a complaint. Where only one Tender is submitted, the Standstill Period shall not apply.
- 422 Where a Standstill Period applies, it shall commence when the Procuring Entity has transmitted to each Tenderer the Notification of Intention to Enter into a Contract with the successful Tenderer.

45. Debriefing by the Procuring Entity

- 45.1 On receipt of the Procuring Entity's Notification of Intention to Enter into a Contract referred to in ITT 43, an unsuccessful tenderer may make a concern(s) regarding their tender. The Procuring Entity shall provide the debriefing within five days of receipt of the request.
- 45.2 Debriefings of unsuccessful Tenderers may be done in writing or verbally. The Tenderer shall bear its own costs of attending such a debriefing meeting.

46. Letter of Award

Prior to the expiry of the Tender Validity Period and upon expiry of the Standstill Period specified in ITT 42.1, upon addressing a complaint that has been filed within the Standstill Period, the Procuring Entity shall transmit the Letter of Award to the successful Tenderer. The letter of award shall request the successful tenderer to furnish the Performance Security within 21 days of the date of the letter.

47. Signing of Contract

- 47.1 Upon the expiry of the fourteen days of the Notification of Intention to enter into contract and upon the parties meeting their respective statutory requirements, the Procuring Entity shall send the successful Tenderer the Contract Agreement.
- 47.2 Within fourteen (14) days of receipt of the Contract Agreement, the successful Tenderer shall sign, date, and return it to the Procuring Entity.
- 47.3 The written contract shall be entered into within the period specified in the notification of award and before expiry of the tender validity period.

48. Performance Security

- 48.1 Within twenty-one (21) days of the receipt of the Letter of Award from the Procuring Entity, the successful Tenderer shall furnish the Performance Security and, any other documents required in the **TDS**, in accordance with the General Conditions of Contract, subject to ITT 38.2 (b), using the Performance Security and other Forms included in Section X, Contract Forms, or another form acceptable to the Procuring Entity. A foreign institution providing a bank guarantee shall have a correspondent financial institution located in Kenya, unless the Procuring Entity has agreed in writing

that a correspondent bank is not required.

- 48.2 Failure of the successful Tenderer to submit the above-mentioned Performance Security and other documents required in the **TDS** or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Tender Security. In that event the Procuring Entity may award the Contract to the Tenderer offering the next Best Evaluated Tender.
- 48.3 Performance security shall not be required for contract estimated to cost less than the amount specified in the Regulations.

49. Publication of Procurement Contract

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

- a) name and address of the Procuring Entity;
- b) name and reference number of the contract being awarded, a summary of its scope and the selection method used;
- c) the name of the successful Tenderer, the final total contract price, the contract duration.
- d) dates of signature, commencement and completion of contract;
- e) names of all Tenderers that submitted Tenders, and their Tender prices as read out at Tender opening.

50. Procurement Related Complaint

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

SECTION III - TENDER DATA SHEET (TDS)

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

A. General	
ITT1.1	The name of the Tender is: REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD The Reference number of the Tender is KeNHA/2988/2026 The number and identification of the lots (contracts) comprising the Tender are: N/A
ITT2.3	The information made available to competing firms is as follows: NONE
ITT2.4	The firms that provided consultancy services for the contract being tendered for are: NONE
ITT3.1	Maximum number of members in the JV shall be: Two (2)
ITT3.10	Citizen contractors are encouraged to source locally manufactured items/materials and locally assembled machines, equipment, vehicles, labour etc.
B. Contents of Tender Documents	
ITT 7.1	i) The Tenderer will submit any request for clarification in writing at the Address indicated in the detailed Tender Notice To reach the Procuring Entity not later than 7 days before bid submission deadline as indicated in the Tender Notice ii) The Procuring Entity will publish the response at the Website <u>www.kenha.co.ke</u>
ITT 7.2	There shall be a mandatory pre-tender site visits as specified in the detailed tender notice
ITT 7.3	The Tenderer will submit any questions in writing, to reach the Procuring Entity not later than the date specified in TDS- ITT 7.1
ITT 7.5	The Procuring Entity's website where Minutes of the pre-Tender meeting and the pre- arranged pretender will be published is <u>www.kenha.co.ke</u>
C. Preparation of Tenders	
ITP 11.1(h)	The Tenderer shall submit the following additional documents in its Tender: <i>As indicated in the Qualification Form/Criteria</i>

ITT 13.1	Alternative Tenders <i>shall not</i> be considered. <i>[If alternatives shall be considered, the methodology shall be defined in Section III, Evaluation and Qualification Criteria.]</i>
ITT 13.2	Alternative times for completion <i>shall not be permitted</i>
ITT 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: <i>None</i>
ITT 14.5	The prices quoted by the Tenderer shall be: <i>fixed</i> .
ITT 15.2	Foreign currency requirements: not allowed .
ITT 18.1	The Tender validity period shall be <u>210 days</u> from the specified date of opening as indicated in the invitation to Tender
ITT 18.2	a) The Number of days beyond the expiry of the initial tender validity period will be 30 days. (b) The Tender price shall be adjusted by the following percentages of the tender price: (i) By 0 % of the local currency portion of the Contract price adjusted to reflect local inflation during the period of extension, And (ii) By 0 % the foreign currency portion of the Contract price adjusted to reflect the international inflation during the period of extension.
ITT 19.1	A Bid Security IS required. The amount and currency of the bid security shall be Twenty Million Kenya Shillings (KShs. 20,000,000.00). The Bid Security shall be an unconditional demand guarantee issued by a bank in the format prescribed in the tender document.
19.2 (h)	The other security is <u>Not Applicable</u>
ITT 19.5	Other documents required are as specified in <i>Form No. 3; Contract Agreement</i>
ITT 19.9	The Procuring Entity will declare the Tenderer ineligible to be awarded contracts by the Procuring Entity for a period of <u>two (2)</u> years.
ITT 20.1	In addition to the original of the Tender, the number of copies is: <u>One Original Only</u>
ITT 20.3	The written confirmation of authorization to sign on behalf of the Tenderer shall consist of: <u>Certificate of Independent Tender Determination Part B of Form of Tender</u>
D. Submission and Opening of Tenders	
ITT 21.3	A tender package or container that cannot fit in the tender box shall be received follows: shall be received at the Supply Chain Management Offices of the location specified in the tender notice.
ITT 22.1	(A) For <u>Tender submission purposes</u> only, the Procuring Entity's address is: As indicated in the detailed Tender Notice Tenders shall not be submitted electronically.

ITT 25.1	If Tenderers are allowed to submit Tenders electronically, they shall follow the electronic tender submission procedures specified below <i>Not Applicable</i>
ITT 25.6	The number of representatives of the Procuring Entity to sign is <i>at least three</i>
E. Evaluation, and Comparison of Tenders	
ITT 30.3	The adjustment shall be based on the average price of the item or component as quoted in other substantially responsive Tenders. If the price of the item or component cannot be derived from the price of other substantially responsive Tenders, the Procuring Entity shall use its Lowest estimate.
ITT 31.2	The error shall be considered a major deviation that leads to disqualification of the tender if the percentage of the error (error over the tender price quoted) is: more than 0% or less than 0%.
ITT 32.1	The currency that shall be used for Tender evaluation and comparison purposes is: <i>Kenya Shillings</i>
ITT 33.2	A margin of preference <i>shall</i> apply. <i>[If a margin of preference applies, the application methodology shall be defined in Section III - Evaluation and Qualification Criteria.]</i>
ITT 33.4	The invitation to tender is extended to the following groups that qualify for reservations- ALL
ITT 34.1	At this time, the Procuring Entity <i>does not intend</i> to execute certain specific parts of the Works by subcontractors selected in advance.
ITT 34.2	Contractor's may propose subcontracting: Maximum percentage of subcontracting permitted is: <u>40% of the total contract amount.</u> Tenderers planning to subcontract more than 10% of total volume of work shall specify, in the Form of Tender, the activity (ies) or parts of the Works to be subcontracted along with complete details of the subcontractors and their qualification and experience.
ITT 34.3	The parts of the Works for which the Procuring Entity permits Tenderers to propose Specialized Subcontractors are designated as follows: For the above-designated parts of the Works that may require Specialized Subcontractors, the relevant qualifications of the proposed Specialized Subcontractors will be added to the qualifications of the Tenderer for the purpose of evaluation. N/A
ITT 35.2 (d)	Additional requirements apply. These are detailed in the evaluation criteria in Section III, Evaluation and Qualification Criteria.
ITT 37	Abnormally High/low Tenders shall be treated as per the procedure outlined in Section IV, Evaluation and Qualification Criteria
ITT 38	Unbalanced or Front-loaded Tenders shall be treated as per the procedure outlined in Section IV, Evaluation and Qualification Criteria

ITT 48.2	Additional requirements are: As detailed in the Qualification Criteria/Form
ITT 49.1	The procedures for making a Procurement-related Complaint are available from the PPRA website info@ppra.go.ke or complaints @ppra.go.ke. If a Tenderer wishes to make a Procurement-related Complaint, the Tenderer should submit its complaint following these procedures, in writing (by the quickest means available, that is either by hand delivery or email to: For the attention: Director General Procuring Entity: Kenya National Highways Authority (KeNHA) Email address: <i>dg@kenha.co.ke</i> In summary, a Procurement-related Complaint may challenge any of the following: (i) the terms of the Tender Documents; and (ii) the Procuring Entity's decision to award the contract.

SECTION IV- EVALUATION AND QUALIFICATION CRITERIA

General Provisions

1. General Provisions

- 1.1 This section contains the criteria that the Employer shall use to evaluate tender and qualify tenderers. No other factors, methods or criteria shall be used other than specified in this tender document. The Tenderer shall provide all the information requested in the forms included in Section IV, Tendering Forms. The Procuring Entity shall use **the Standard Tender Evaluation Document for Goods and Works** for evaluating Tenders.
- 1.2 Wherever a Tenderer is required to state a monetary amount, Tenderers should indicate the Kenya Shilling equivalent using the rate of exchange determined as follows:
 - a) For construction turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year (in which the amounts for that year is to be converted) was originally established.
 - b) Value of single contract - Exchange rate prevailing on the date of the contract signature.
 - c) Exchange rates shall be taken from the publicly available source identified in the ITT 14.3. Any error in determining the exchange rates in the Tender may be corrected by the Procuring Entity.
- 1.3 Evaluation and contract award Criteria

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

2. Preliminary examination for Determination of Responsiveness

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

i. Financial Capacity:

- The Tenderer shall demonstrate access to, or availability of, **liquid assets, unencumbered real assets, lines of credit, or other financial means** (independent of any contractual advance payment) sufficient to meet the construction cash flow requirement equivalent to **Kshs 400,000,000.00**.
- In the case of a **Joint Venture (JV)**, the domestic partner shall provide a line of credit or demonstrate a cash flow capacity of **Kshs 200,000,000.00**.

ii. Minimum Average Annual Construction Turnover

- The Tenderer shall have a minimum average annual construction turnover of **Kshs 1,500,000,000.00**, calculated as the total gross certified payments received for contracts in progress and/or completed within the last five (5) years, divided by five (5).
- In the case of a **Joint Venture (JV)**, the domestic partner shall demonstrate an average annual turnover of **Kshs 300,000,000.00** for the same period, also calculated based on total gross certified payments received.

iii. Similar Contracts Executed:

- The Tenderer shall have executed at least **two (2) contracts** of a similar nature, each with a minimum value of **Kshs 2,000,000,000.00**, within the last five (5) years. At least **one (1) contract** shall have been satisfactorily and substantially completed (Eighty Percent) as a **prime contractor** or **joint venture** member within **Kenya or the East African Community**.

iv. Contractor's Representative and Key Personnel:

- The Tenderer shall provide qualified personnel, including a **Site Agent, Site Engineers, Surveyor, Environmentalist, Sociologist** and other key staff, as specified in the tender documents.

v. Contractor's Key Equipment:

- The Tenderer shall possess the necessary equipment listed in the table "Contractor's Equipment" below, including but not limited to [specify requirements].

vi. Other Conditions:

- The Tenderer shall comply with any additional conditions specified in the tender documents, including environmental, safety, and quality standards.

a. Assessment of Adequacy of Technical Proposal with Requirements (If Applicable)

The Procuring Entity will evaluate the Technical Proposals of all irresponsible tenders using the following criteria, sub-criteria, and point system for the evaluation of the Technical Proposals:

- History of non-performance
- Financial capability
- General and specific experience
- Key personnel
- Contractors Plant and Equipment
- Adequacy and quality of the proposed methodology, and work plan in responding to the schedule of Requirements:

Total points for the six criteria: 100points. The minimum technical score (St) required to pass is: 75points.

Tenderers who score less than the required pass will be automatically disqualified. Tenderers who pass the technical evaluation will be evaluated further.

3. Tender Evaluation (ITT 35)

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

- Alternative Completion Times**, if permitted under ITT 13.2, will be evaluated as follows:
.....N/A.....
- Alternative Technical Solutions** for specified parts of the Works, if permitted under ITT 13.4, will be evaluated as follows:N/A.....
- Other Criteria**; if permitted under ITT 35.2(d):N/A.....

4. Multiple Contracts

Delete in its entirety.

5. Alternative Tenders (ITT 13.1)

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

The Procuring Entity shall consider Tenders offered for alternatives as specified in Part 2-Works Requirements. Only the technical alternatives, if any, of the Tenderer with the Best Evaluated Tender conforming to the basic technical requirements shall be considered by the Procuring

6. Margin of Preference

- 1.1 If the TDS so specifies, the Procuring Entity will grant a margin of preference of fifteen percent (15%) to be loaded one valuated price of the foreign tenderers, where the percentage of shareholding of Kenyan citizens is less than fifty-one percent (51%).
- 1.2 Contractors applying for such preference shall be asked to provide, as part of the data for qualification, such information, including details of ownership, as shall be required to determine whether, according to the classification established by the Procuring Entity, a particular contract or or group of contractors qualifies for a margin of preference.
- 1.3 After Tenders have been received and reviewed by the Procuring Entity, responsive Tenders shall be assessed to ascertain their percentage of shareholding of Kenyan citizens. Responsive tenders to shall be classified into the following groups:
 - i) Group A: tenders offered by Kenyan Contractors and other Tenderers where Kenyan citizens hold shares of over fifty one percent (51%).
 - ii) Group B: tenders offered by foreign Contractors and other Tenderers where Kenyan citizens hold shares of less than fifty one percent (51%).
- 1.4 All evaluated tenders in each group shall, as a first evaluation step, be compared to determine the lowest tender, and the lowest evaluated tender in each group shall be further compared with each other. If, as a result of this comparison, a tender from Group A is the lowest, it shall be selected for the award. If a tender from Group B is the lowest, an amount equal to the percentage indicated in Item 3.1 of the respective tender price, including unconditional discounts and excluding provisional sums and the cost of day works, if any, shall be added to the evaluated price offered in each tender from Group B. All tenders shall then be compared using new prices with added prices to Group Band the lowest evaluated tender from Group A. If the tender from Group A is still the lowest tender, it shall be selected for award. If not, the lowest evaluated tender from Group B based on the first evaluation price shall be selected.

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

- a) In case the tender was subject to post-qualification, the contract shall be awarded to the lowest evaluated tenderer, subject to confirmation of pre-qualification data, if so required.
- b) In case the tender was not subject to post-qualification, the tender that has been determined to be the lowest evaluated tenderer shall be considered for contract award, subject to meeting each of the following conditions.
 - i) The Tenderer shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow of Kenya Shillings
 - ii) Minimum average annual construction turnover of **Kenya Shillings 1,500,000,000.00**, equivalent calculated as total certified payments received for contracts in progress and/or completed within the last **5 years**.

- iii) At least **two (2)** of contract(s) of a similar nature executed within Kenya, or the East African Community or abroad, that have been satisfactorily and substantially completed as a prime contractor, or joint venture member or sub-contractor each of minimum value **Kenya shillings 2,000,000,000.00**.
 - iv) Contractor's Representative and Key Personnel, which are specified in the Qualification Criteria.
 - v) Contractors key equipment listed on the table “Contractor's Equipment” below and more specifically listed as in the Qualification Criteria.
 - vi) Other conditions depending on their seriousness.
- c) **History of non-performing contracts:**
- Tenderer and each member of JV incase the Tenderer is a JV, shall demonstrate that Non-performance of a contract did not occur because of the default of the Tenderer, or the member of a JV in the last 5 years. The required information shall be furnished in the appropriate form.
- d) **Pending Litigation**
- Financial position and prospective long-term profitability of the Single Tenderer, and in the case the Tenderer is a JV, of each member of the JV, shall remain sound according to criteria established with respect to Financial Capability under Paragraph (i) above if all pending litigation will be resolved against the Tenderer. Tenderer shall provide information on pending litigations in the appropriate form.
- e) **Litigation History**
- There shall be no consistent history of court/arbitral award decisions against the Tenderer, in the last 5 years. All parties to the contract shall furnish the information in the appropriate form about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the years specified. A consistent history of awards against the Tenderer or any member of a JV may result in rejection of the tender.

SECTION IV: EVALUATION AND QUALIFICATION CRITERIA CONTD...

This Section contains all the factors, methods and criteria that the Employer shall use to evaluate applications. The information to be provided in relation to each factor and the definitions of the corresponding terms are included in the respective Application Forms.

1. Eligibility Requirements
2. Historical Contract Non-Performance
3. Financial Situation
4. Technical/Engineering Works Experience
5. Program of Works and Work Methodology
6. Key Professional and Technical Site Staff
7. Major Plant and Equipment to be used in the Project

QUALIFICATION FORM

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
A. PRELIMINARY EVALUATION				
1.	Nationality	Nationality in accordance with ITT 3.6	Forms ELI - 1.1, 1.2 and 1.3, with attachments	
2.	Goods, equipment and services to be supplied under the contract	To have their origin in any country that is not determined ineligible under ITT 4.1	Forms ELI - 1.4	
3.	Conflict of Interest	No conflicts of interest in accordance with ITT 3.3	Form of Tender	
4.	PPRA Eligibility	Not having been declared ineligible by the PPRA as described in ITT 3.7	Form of Tender - Form SD 1	
5.	State- owned Enterprise	Meets conditions of ITT 3.8	Forms ELI - 1.1 and 1.2, with attachments	
6.	Appendix to Form of Bid	Form properly filled & signed	Appendix to Form of Bid in the Prescribed Format	
7.	Suspension Based on Execution of Tender/Proposal Securing Declaration by the Procuring Entity	Not under suspension based on-execution of a Tender/Proposal Securing Declaration pursuant to ITT 19.8.	To be confirmed from Internal records by the procuring entity	

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
8.	Pending Litigation	Tender's financial position and prospective long-term profitability still sound according to criteria established in 3.1 and assuming that all pending litigation will NOT be resolved against the Tenderer.	Form CON - 1	
9.	Litigation History	No consistent history of court/arbitral award decisions against the Tenderer for the last three (3) years.	Form CON - 1	
10.	Declaration of Fair employment laws and practices	Bidders shall declare they are not guilty of any serious violation of fair employment laws and practices and will be bound to abide by the industry CBA at minimum	Form CON - 2	
11.	Declaration of Knowledge of Site /Pre-Bid Conference	● Attend Pre-Tender Site Visits as per TDS, ITT 7.1 ● Bidders to sign attendance register ● Certificate must be signed by the Employer's representative ● Bidders to send Technical Persons for the Site Visit – Min Qualifications – as indicated in the TENDER NOTICE.	Form CON - 3	
12.	Tender Security	Tender Security document	a) Form in the Prescribed Format b) Digital Tender Securities will be accepted	

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
13.	Priced Bill of Quantities	- Fill all rates, and amounts, - NO Alterations of the Quantities accepted, - All bidders own Corrections must be Countersigned - NO Errors noted in the Bills of Quantities - Accurate transfer of respective major rates from Schedule G of Part II to the BoQ	Bills of Quantity in the Prescribed Format	
14.	Annual Practicing License with the National Construction Authority	Proof of registration with the National Construction Authority in Category-NCA 1 Roads/Bridges Contractor.	Copy of Current NCA Practicing License	
15.	Tax Obligations for Kenyan Tenderers	Has produced a current tax clearance certificate or tax exemption certificate issued by the Kenya Revenue Authority in accordance with ITT 3.16.	Provide Valid Tax Compliance Certificate	
16.	Serialization of the Bid	Bidders shall sequentially serialize all pages of each tender submitted. Any written Pages or document attached or inserted Documents MUST be sequentially serialized.	The Serialization MUST be numerically sequential starting from Numeric 1 (including the cover page).	
17.	Completeness of tender document	The person or persons signing the bid shall initial all pages of the bid where	All pages with entries (Typed or hand written) must be initialed.	

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
		entries have been made. Bidders shall own all alterations made to the tender document. Bidders shall duly fill all relevant forms/schedules provided for in the document that requires entries	Any alterations made in the tender document must be countersigned. All relevant Forms/ Schedules shall be duly filled	
18.	Proposed weightings	Dully filled and Signed Schedule H	Bidder to fill Schedule H: Basic Prices for Materials and Labour	
19.	Rates derivation	Bidders shall provide current (at least 28 days before tender opening) proof of cost of materials e.g. Proforma Invoices/quotation (Cement, Bitumen etc)	Bidder to fill Schedule G: Part I. Schedule of Materials; -Basic Prices Part II. Schedule of rates derivation	
B. TECHNICAL EVALUATION				
1.	History of Non-Performing Contracts	Non-performance of a contract did not occur as a result of contractor default for the last three (3) years. Non-performance shall be deemed to have occurred by evidence of: - Termination Letter - Liquidated Damages	Form CON-1 <i>If a bidder fails to disclose, shall be disqualified</i> <i>Reference to be made to procuring Authority's records</i> <i>A bidder with any history of non-performance earns zero (0) marks</i>	2 Marks

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
2.	Financial Capabilities	(i) Audited Statements: Bidders shall provide audited balance sheets or, if not required by the laws of the Tenderer's country, other financial statements acceptable to the Procuring Entity, for the last 3 years shall be submitted and must demonstrate the current soundness of the Tenderer's financial position and indicate its prospective long-term profitability (as demonstrated by Financial Evaluation ratios).	Form FIN - 3.1, with attachments Attachments include: <i>i. Audited accounts</i> <i>All pages must be initialed and stamped by both a practicing Auditor registered with ICPAK and one of the Directors. Auditor's practicing membership number from ICPAK must be indicated and a valid practicing license shall be provided.</i>	3 Marks
		(ii) Working Capital The Tenderer shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet annual construction cash flow of equivalent to Kshs 1,500,000,000.00. In the case of a Joint Venture (JV), the domestic partner shall provide a line of credit or demonstrate a cash flow capacity of Kshs 300,000,000.00.	● <i>Line of Credit</i> ● <i>Bank statements</i> <i>Etc</i>	3 Marks

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
		(iii) Financial soundness The audited balance sheets or, if not required by the laws of the Tenderer's country, other financial statements acceptable to the Procuring Entity, for the last 3 years shall be submitted and must demonstrate the current soundness of the Tenderer's financial position and indicate its prospective long-term profitability. In case of a JV, both partners are required to submit their financial statements and respective financial ratios	<i>The Financial ratio Form to be signed by the Auditor registered with ICPAK and one of the Directors</i> • <i>Financial Ratios</i> Computation shall be made for the following Ratios and marks awarded to each of the ratios: -Working Capital - Debt to Equity Ratio - Current ratio - Operating Cash Flow ratio	4 Marks
3.	Average Annual Construction Turnover	The Tenderer shall have a minimum average annual construction turnover of Kshs 1,200,000,000.00, calculated as the total gross certified payments received for contracts in progress and/or completed within the last three (3) years, divided by three (3). In the case of a Joint Venture (JV), the domestic partner shall demonstrate an average annual construction turnover of Kshs 400,000,000.00 for the same period, also calculated based on total gross certified payments received.	Form FIN - 3.2 <i>Attachments include Financial Statements and invoices</i>	2 Marks

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
4.	Current Commitments/ Workload Analysis	The total value of outstanding works on the on-going contracts should not exceed the average annual construction turnover for the last three (3) years. In case of a JVs, the above requirement shall apply.	Form FIN - 3.3 If the value of the outstanding Works and the new commitment is more than the operating cash flow (based on the last audited financial statement) of the bidder, the bidder loses two marks	2 marks
5.	General Construction Experience	Experience under construction contracts in the role of prime contractor, sub-contractor, or management contractor for at least the last 5 years. Grading shall be based on general construction projects handled. Five projects and above earns maximum points and prorated downwards. In case of JVs, the above requirement shall be co-owned.	Form EXP -4.1 Attach Letters of Award and Completion Certificates	5 Marks
6.	Specific Construction & Contract Management Experience	The Tenderer shall have executed up to 3 no. contracts of a similar nature, with a minimum cumulative value of Kshs 2,000,000,000.00 , within the last five (5) years. At least one (1) contract shall have been satisfactorily and substantially completed (over eighty per cent) as a prime contractor or joint venture member within Kenya or the East African Community. <i>(In case of a Joint Venture (JV) All members combined must meet requirements)</i>	Form EXP 4.2(a) Provide Letters of Award and Completion Certificates For subcontracted works, the bidder should provide the following; • Award letter of the main contractor • Award letter of the subcontract. • Completion letter of the subcontract.	15 Marks

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
			• <i>Subcontract approval from the Engineer/supervision Authority</i>	
7.	4.2(b) Specific Construction & Contract Management Experience – Key Activities	For the above and any other contracts [substantially completed and under implementation] as prime contractor, joint venture member, or Subcontractor in the last five (5) years and Application submission deadline, a minimum construction experience in the following key activities successfully completed: ○ <i>Earthworks Cut/Fills – 400,000m³</i> ○ <i>Processing Cement improved material – 120,000m³</i> ○ <i>Asphalt Concrete – 10,000m³</i> ○ <i>Concrete Works 800m³</i>	Form EXP 4.2(b) • <i>Award letter</i> • <i>Completion Certificates</i> • <i>Copies of BoQ</i> • <i>Copies of Certified Quantities in IPCs</i>	8 Marks
8.	Contractor's Representative and Key Personnel	Tenderers must demonstrate that it will have a suitably qualified Contractor's Representative and suitably qualified (and in adequate numbers) Key Personnel, as listed below <i>(In case of a Joint Venture (JV) All members combined must meet requirements)</i>	Schedule F (Form PER. 1 and PER. 2) <i>Curriculum Vitae (CVs) of the Proposed Key Staff must be presented in the provided format and duly signed by the proposed individual. Copies of certificates and Annual Practicing Licenses (for Engineers) and Academic Certificates for all staff is mandatory.</i>	15 Marks

[illegible]

Item No.	Qualification Subject	Qualification Requirement			Document To be Completed/provided by Tenderer		For Procuring Entity's Use (Qualification met or Not Met)
		4.	Foreman (Max 2marks)	Qualification	HND	1	
					Diploma	0.8	
				Relevant experience	10 years and above	1.0	
					6-9years	0.5	
					Less than 6	0	
		5.	Environmental Specialist & Social Specialist Max 2marks)	Qualification and certification	Degree and registration with NEMA	1	
				Relevant experience	10 years and above	1.0	
					6-9years	0.5	
					Below 6 years	0	
		6.	Road Safety Specialist (Max 2marks)	Qualification and certification	Degree holder & occupational health and Safety certification	1	
				Relevant experience	10 years and above	1.0	
					6-9years	0.5	
					Below 6 years	0	

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)																								
9.	Contractors equipment key	- Bidders shall declare they have possession/Ownership of various equipment as proposed to be used in the Project by providing Logbooks that demonstrate proof of ownership - For Bidders planning to hire, they shall provide an Active Lease Agreement in Place that can be used during the Project Life. The copy of logbooks of the lessor(s) shall also be provided.	Schedule D of Technical Proposal	30 Marks																								
10.																												
		<table><tr><th>Main Scope of Works of Tender</th><th>Main Equipment</th><th>Quantity (No) (Minimum)</th><th colspan="2">Marks (Score)</th><th rowspan="2">No. of Equipment to be made available for the Contract by the Bidder</th></tr><tr><th></th><th></th><th></th><th>For No. of Equipment Owned by the Bidder</th><th>For No. of Equipment to be hired/ purchased by the Bidder</th></tr><tr><td>Earthworks</td><td colspan="4">a) General Plant</td><td></td></tr><tr><td>Concrete works</td><td>Primary/Secondary Crusher Unit/Power Screen Min capacity – 90t/hr.</td><td>1</td><td></td><td></td><td></td></tr></table>	Main Scope of Works of Tender	Main Equipment	Quantity (No) (Minimum)	Marks (Score)		No. of Equipment to be made available for the Contract by the Bidder				For No. of Equipment Owned by the Bidder	For No. of Equipment to be hired/ purchased by the Bidder	Earthworks	a) General Plant					Concrete works	Primary/Secondary Crusher Unit/Power Screen Min capacity – 90t/hr.	1						
	Main Scope of Works of Tender	Main Equipment	Quantity (No) (Minimum)	Marks (Score)		No. of Equipment to be made available for the Contract by the Bidder																						
			For No. of Equipment Owned by the Bidder	For No. of Equipment to be hired/ purchased by the Bidder																								
Earthworks	a) General Plant																											
Concrete works	Primary/Secondary Crusher Unit/Power Screen Min capacity – 90t/hr.	1																										

Item No.	Qualification Subject	Qualification Requirement		Document To be Completed/provided by Tenderer			For Procuring Entity's Use (Qualification met or Not Met)	
		Bituminous works (AC & Surface Dressing)	Concrete batching plant Min Cap 20 m3/hr	1	3	1.4		
			Asphalt Concrete batching plant.	1				
		b) Bituminous Plants						
		Bitumen Pressure distributor	2	2	1			
		Asphalt concrete paver	1					
		c) Compactors						
		Vibrating compaction plate 300 mm wide	2	1.5	0.5			
		Vibrating compaction plate 600 mm wide	1					
		d) Mobile Compressors						
		Single tool (1.8 m3/min)	1	1.5	1.0			
		Two tool (2.8 – 7.3 m3/min)	1					
		Four tool (11.3 – 25.3 m3/min)	1					
		Medium rock drill (1.5 m3/min)	1					

Item No.	Qualification Subject	Qualification Requirement		Document To be Completed/provided by Tenderer			For Procuring Entity's Use (Qualification met or Not Met)	
			Heavy rock drill (2.4 m3/min	1				
			e) Concrete Equipment					
			Mobile concrete mixers	2	5	1.5		
			Truck mounted mixers	1				
			Concrete vibrators	5				
			f) Transport (Tippers, dumpers, water tankers)					
			4X2 tippers payload 7 – 12 tonnes	10	12.5	4		
			6X4 tippers payload 16 – 20 tonnes	2				
			8X4 tippers payload 16 – 20 tonnes	1				
			Flatbed lorries	2				
			Water tankers (18,000 – 20,000 lts. capacity)	4				
			g) Diesel Generators					
			Diesel generators (15 – 200Kva)	3	1.5	0.5		
			h) Excavators					

Item No.	Qualification Subject	Qualification Requirement		Document To be Completed/provided by Tenderer			For Procuring Entity's Use (Qualification met or Not Met)	
			Hydraulic crawler mounted (7 – 10 tonnes) – 0.25 – 0.4 m3 SAE bucket.	1	8	2.4		
			Hydraulic crawler mounted (10 – 16 tonnes) – 0.40 – 0.60 m3 SAE bucket.	2				
			Hydraulic wheel mounted (7 – 10 tonnes) – 0.25 – 0.4 m3 SAE bucket.	2				
			Hydraulic wheel mounted (10 – 16 tonnes) – 0.40 – 0.6 m3 SAE bucket.	1				
			Hydraulic wheel mounted backloader (7 – 10 tonnes) – 0.25 – 0.4 m3 SAE bucket.	1				
			i) Rollers					
			Self-propelled single drum vibrating (various types)	3	5	1		
			Pneumatic rubber tyre (1-2 tonnes/wheel)	2				
			Sheep’s foot roller	2				

Item No.	Qualification Subject	Qualification Requirement		Document To be Completed/provided by Tenderer			For Procuring Entity's Use (Qualification met or Not Met)
			Double drum vibrating roller	2			
			pedestrian rollers	2			
			Pulvimixer	2			
			Motor graders	4			
			Total		40	13.3	
			Note: Score for Construction Equipment = (X/40)*30 ----Owned = (Y/40)*30----Hired				
		11.	Proposed methodology	Adequacy and quality of the proposed methodology	a) Technical approach and methodology ● Provided a detailed Work Methodology: a) Procedure on execution of activities as outlined in the BoQs b) Allocation of machinery/labour in execution the activities c) Procedures in quality control of		

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
			the activities described in BoQs • Provided a Methodology on safety during the construction period: a) Personal protective equipment b) Signages c) Delineation of construction and passage of traffic d) Passage of traffic at night • Provide a specific Quality management plan that covers the following: 1. Scope Management 2. Time Management 3. Material Quality Management 4. Financial Management 5. Risk Management 6. Health & Safety Management 7. Communication Management 8. Procurement Management 9. Human Resource Management Stakeholder Management	1 Mark 1 Mark

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
			b) Work plan/Program of Works (PoW) - PoW Resourced with Equipment- Min. allocation pursuant to the Schedule E of Technical Proposal – To be submitted in A3 Size Paper well legible Fonts - PoW captures Monthly outputs for each activity - PoW details BoQ Quantities, Units and Rates - PoW is superimposed with Cashflow Projections as detailed in Schedule A of the technical proposal	2 Marks
			c) Site Organization and staffing (Schedule B of Technical proposal)	1 Mark

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
12.	Environmental & Social impact requirements	Adequacy and quality of the proposed Environmental and social impact requirements	a) Relevant plan on Gender issues b) Social welfare c) Environmental management d) Staffing: • Environmentalist • Sociologists	1mark 1mark 2mark 0.5mark 0.5mark <i>The total score will be prorated to a max of 2 marks</i>
13.	Participation by Kenyan citizens among proposed Key Experts	No of local (Kenyan) key experts from the list of key staff provided under item 7	1. Site Agent 2. Material Engineer & Structural/ Bridge Engineer 3. Surveyor 4. Foreman 5. Environmental Specialist 6. Safety Specialist	1mark 1mark 1mark 1mark 0.5mark 0.5mark <i>The total score will be prorated to a max of 2 Marks</i>

Tenderers who score less than the required pass (75%) will be automatically disqualified. Tenderers who meet the minimum pass mark in the technical evaluation will be evaluated further.

Item No.	Qualification Subject	Qualification Requirement	Document To be Completed/provided by Tenderer	For Procuring Entity's Use (Qualification met or Not Met)
C. FINANCIAL EVALUATION: The lowest evaluated bidder shall be subjected to Financial Evaluation which include but not limited to sensitivity analysis of the rates to detect abnormally low bids or abnormally high bids or unbalanced tenders or front loaded. Treatment of Abnormally Low Bid/Abnormally high Bid/ Unbalanced bid The Procuring Entity may undertake an analysis of bidders' rates which are potentially lower/higher than the known prevailing market rates. The bidders shall be required to provide objective justification including supporting documents on derivation of their rates within stipulated time to the Procuring Entity (<i>See Schedule G, Part I&II on Derivation of Rates</i>). In addressing the above criteria, the following steps shall be undertaken by the Procuring Entity; Identify: The Procuring Entity identifies a potential Abnormally Low/High Bid based on comparison with known prevailing market rates or with the project's total cost estimate. Evaluate: The Procuring Entity fully analyses the Bidder's justification provided on Schedule G to verify if it is Abnormally Low/High Bid. Due diligence may be carried out by the Procuring Entity on the bidder's documentation. Determination: The Procuring Entity fully documents the decision to accept or reject the Bid and executes appropriate action(s)/recommendation(s) including but not limited to enhancement of the performance Security. In view of the above, the procuring Entity shall evaluate and analyze the Bidders' submissions against the known prevailing market rates and cost estimation guidelines. The analysis of the bidder's justification shall consider all evidence provided. Accordingly, the Procuring Entity's relevant committee shall make a recommendation to the Accounting Officer.				
D. POST QUALIFICATION: The procuring entity may verify the documents provided by the bidder with the issuing authority.				

APPENDIX TO THE QUALIFICATION CRITERIA

ITEM		DESCRIPTION	POINT SCORE SCALE
1		HISTORY OF NON-PERFORMANCE	Max 2
		History of Non-Performance	0-2
2		FINANCIAL CAPACITY	Max 12
	a	Audited Statements	0-3
	b	Working capital	0-3
	c	Financial Ratios attested by CPA	0-4
	d	Average Annual Construction Turnover	0-2
	e	Current Commitments	0-2
3		EXPERIENCE	Max 30
	a	General Experience	0-5
	b	Specific experience in related works	0-15
	c	Workload Analysis	0-2
	d	Specific experience as per 4(b)	0-8
4		KEY PERSONNEL	Max 15
	a	Site Agent	4
	b	Materials Engineer	3
	c	Surveyor	2
	d	Foreman	2
	e	Environmental and Social Safeguards specialist	2
	f	Safety Specialist	2
5		PLANT AND EQUIPMENT	Max 30
		Relevant Equipment (As detailed in Schedule D)	Owned (Max 30 marks)
			Leased (Max 10 marks)
6		WORK METHODOLOGY	Max 7
	a	Detailed Work Methodology	0-2
	b	Methodology on Safety	0-1
	c	Specific Quality Management Plan	0-1
	d	Program of Works	0-2
	e	Site Organization and Staffing	0-1
7		Environmental and Social impact requirements	0-2
8		Participation by Kenyan citizens among proposed Key Experts	0-2
		TOTAL	MAX 100

SECTION V - TENDERING FORMS

- 1. TENDERER'S QUALIFICATION FORMS**
 - Form ELI-1.1- Tenderer Information Form**
 - Form ELI- 1.2- Tenderer JV information**
 - Form ELI - 1.3- Qualification of Foreign Contractors**
 - Form ELI - 1.4- Declarations of materials, equipment and labor sources**
- 2. FORM OF TENDER**
 - A. TENDERER'S ELIGIBILITY - CONFIDENTIAL BUSINESS QUESTIONNAIRE**
 - B. CERTIFICATE OF INDEPENDENT TENDER DETERMINATION**
 - C. SELF-DECLARATION FORMS**
 - FORM SD1**
 - FORM SD2**
 - FORM SD3**
- 3. APPENDIX TO FORM OF TENDER**
- 4. CONTRACTUAL FORMS**
 - FORM CON – 1**
 - FORM CON – 2**
 - FORM CON – 3**
- 5. FINANCIAL FORMS**
 - FORM FIN- 3 .1**
 - FORM FIN- 3.2**
 - FORM FIN- 3.3**
- 6. TECHNICAL EXPERIENCE**
 - FORM EXP - 4.1**
 - FORM EXP - 4.2 (A)**
 - FORM EXP - 4.2 (B)**
- 7. TECHNICAL PROPOSAL**
 - SCHEDULE A. Projected Cash Flow**
 - SCHEDULE B. Site Organizations**
 - SCHEDULE C. Subcontractors**
 - SCHEDULE D. Contractor's Equipment**
 - SCHEDULE E. Initial Tentative Program of Performance**
 - SCHEDULE F. Key Personnel Proposed**
 - SCHEDULE D. Schedule of Materials Basic Rates**
- 8. FORM OF TENDER SECURITY - DEMAND GUARANTEE**
- 9. FORM OF TENDER SECURITY (TENDER BOND)**
- 10. FORM OF TENDER-SECURING DECLARATION**
- 11. FORM OF DECLARATION OF FAIR EMPLOYMENT LAWS AND PRACTICES**
- 12. FORM OF DECLARATION OF CONTRACTS TERMINATED IN THE LAST THREE (3) YEARS**

TENDERER'S QUALIFICATION FORMS

FORM ELI-1.1- TENDERER INFORMATION FORM

Form ELI-1.1
Tenderer Information Form
Date: _____ Tender No. _____ Tender title: _____
Tenderer's name:
In case of Joint Venture (JV), name of each member:.....
Tenderer's actual or intended country of registration: <i>[indicate country of Constitution]</i>
Tenderer's actual or intended year of incorporation:
Tenderer's legal address [in country of registration]:
Tenderer's authorized representative information Name: Address: Telephone/Fax numbers: E-mail address:
1. Attached are copies of original documents of: I. <i>Certificate of Incorporation and CR12</i> of the legal entity named above, in accordance with ITT 4.1. II. <i>Copies of National Identification documents for Directors</i> ☐ In case of a JV, Form of intent to form JV or JV agreement, in accordance with ITT 4.1. ☐ In case of a state-owned enterprise or institution, in accordance with ITT 4.7. documents establishing: • Legal and financial autonomy • Operation under commercial law • Establishing that tenderer is not under the supervision of the Procuring Entity,

2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership (*Applicable*).

FORM ELI- 1.2- TENDERER JV INFORMATION

Tenderer's JV Information Form

(to be completed for each member of Tenderer's JV)

Date: _____

Tender No. _____

Tender title: _____

Tenderer's JV name:
JV member's name:
JV member's country of registration:
JV member's year of constitution:
JV member's legal address in country of constitution:
JV member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of: i. Certificate of Incorporation and CR 12 of the legal entity named above, including Registered JV agreement (Registration of Documents Act), in accordance with ITT 4.1. ii. Copies of National Identification documents for all Directors ☐ In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and that they are not under the supervision of the Procuring Entity, in accordance with ITT 4.7. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership (<i>Applicable</i>).

FORM ELI - 1.3- QUALIFICATION OF FOREIGN CONTRACTORS

Qualification of Foreign Tenderers

Pursuant to ITT 4.10, a foreign tenderer must complete this form to demonstrate that the tender fulfils this condition (the 40% Rule).

ITEM	Description of Work Item	Describe location of source	COST in K. shillings	Comments, if any
A	Local Labour			
1				
2				
3				
4				
5				
B	Sub contracts from Local sources			
1				
2				
3				
4				
5				
C	Local materials			
1				
2				
3				
4				
5				
D	Use of Local Plant and Equipment			
1				
2				
3				
4				
5				
E	Add any other items			

ITEM	Description of Work Item	Describe location of source	COST in K. shillings	Comments, if any
A	Local Labour			
1				
2				
3				
4				
5				
6				
7				
	TOTAL COST LOCAL CONTENT		xx	
	PERCENTAGE OF CONTRACT PRICE		xx	

FORM ELI - 1.4- DECLARATIONS OF MATERIALS, EQUIPMENT AND LABOUR SOURCES

Pursuant to ITT 5.1, tenderers must complete this form to demonstrate that the tender fulfils this condition

ITEM	Description of Work Item	Describe location of source	Comments, if any
A	Materials		
1			
2			
3			
4			
5			
6			
B	Equipment		
1			
2			
3			
4			
5			
C	Labour		
1			
2			
3			
4			
5			
6			
	TOTAL COST LOCAL CONTENT		
	PERCENTAGE OF CONTRACT PRICE		

FORM OF TENDER

INSTRUCTIONS TO TENDERERS

- (i) The Tenderer must prepare this Form of Tender on stationery with its letterhead clearly showing the Tenderer's complete name and business address.
 - (ii) All italicized text is to help Tenderer in preparing this form.
 - (iii) Tenderer must complete and sign and TENDERER'S ELIGIBILITY- CONFIDENTIAL BUSINESS QUESTIONNAIRE, CERTIFICATE OF INDEPENDENT TENDER DETERMINATION and the SELF DECLARATION OF THE TENDERER, all attached to this Form of Tender.
- i) The Form of Tender shall include the following Forms duly completed and signed by the Tenderer.
- A) Tenderer's Eligibility- Confidential Business Questionnaire
 - B) Certificate of Independent Tender Determination
 - C) Self-Declaration of the Tenderer

FORM OF TENDER

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

Invitation to Tender No.: *[insert identification]* Alternative No.: *[Not Applicable]*

To:

We, the undersigned, declare that:

- a) *No reservations:* We have examined and have no reservations to the tendering document, including Addenda issued in accordance with Instructions to Tenderers (ITT) ;
- b) *Eligibility:* We meet the eligibility requirements and have no conflict of interest in accordance with ITT4;
- c) *Tender-Securing Declaration:* We have not been suspended nor declared ineligible by the Procuring Entity based on execution of a Tender-Securing Declaration or Proposal-Securing Declaration in Kenya in accordance with ITT 4.8.
- d) *Conformity:* We offer to execute in conformity with the tendering document and in accordance with the construction or service schedule the following Works:
[Tender Number and Name]
- e) *Tender Price:* The total price of our Tender is [name of currency] (*amount in figures and words*).

- f) *Combined Price:* We hereby confirm that our combined price for Rehabilitation Works and Improvement Works does not exceed the threshold given in the TDS ITT 37.5, which is **[NOT APPLICABLE]**.
- g) *Tender Validity Period:* Our Tender shall be valid for a period specified in TDS 18.1 (or as amended if applicable) from the date fixed for the Tender submission deadline specified in TDS 22.1 (or as amended if applicable), and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- h) *Performance Security:* If our Tender is accepted, we commit to obtain a Performance Security in accordance with the tendering document;
- i) *One Tender per Tenderer:* We are not submitting any other Tender (s) as an individual Tenderer, and we are not participating in any other Tender(s) as a Joint Venture member or as a subcontractor, and meet the requirements of ITT 4.4, other than alternative Tenders submitted in accordance with ITT 13;
- a) *Suspension and Debarment:* We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Procuring Entity. Further, we are not ineligible under Kenya laws or official regulations or pursuant to a decision of the United Nations Security Council;
- b) *State-owned enterprise or institution:* [select the appropriate option and delete the other] [We are not a state-owned enterprise or institution] / [We are a state-owned enterprise or institution but meet the requirements of ITT 4.7];
- c) *Commissions, gratuities and fees:* We have paid, or will pay the following commissions, gratuities, or fees with respect to the Tendering process or execution of the Contract: [insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity].

Name of Recipient	Address	Reason	Amount

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

- d) *Binding Contract:* We understand that this Tender, together with your written acceptance thereof included in your Form of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;
- e) *Not Bound to Accept:* We understand that you are not bound to accept the lowest evaluated cost Tender, the Best Evaluated Tender or any other Tender that you may receive;
- f) *Fraud and Corruption:* We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Fraud and Corruption;
- g) *Collusive practices:* We hereby certify and confirm that the tender is genuine, non-collusive and made with the intention of accepting the contract if awarded. To this effect we have signed the “Certificate of Independent Tender Determination” attached below.
- r) We undertake to adhere by the Code of Ethics for Persons Participating in Public Procurement and Asset Disposal, copy available from www.ppra.go.ke during the procurement process and the execution of any resulting contract.
- s) We, the Tenderer, have completed fully and signed the following Forms as part of our Tender:
- a) Tenderer's Eligibility; Confidential Business Questionnaire – to establish we are not in any conflict to interest.
- b) Certificate of Independent Tender Determination – to declare that we completed the tender without colluding with other tenderers.

- a) Self-Declaration of the Tenderer – to declare that we will, if awarded a contract, not engage in any form of fraud and corruption.
- b) Declaration and commitment to the Code of Ethics for Persons Participating in Public Procurement and Asset Disposal.
- t) Further, we confirm that we have read and understood the full content and scope of fraud and corruption as informed in “Appendix 1- Fraud and Corruption” attached to the Form of Tender.

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

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

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

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

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

Name in the capacity of _____

Signed _____

Duly authorized to sign the Tender for and on behalf of

Dated on _____ day of _____, _____

A. TENDERER'S ELIGIBILITY - CONFIDENTIAL BUSINESS QUESTIONNAIRE

Instruction to Tenderer

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

a) Tenderer's details

S/No.	ITEM	
1	Name of Procuring Entity	Kenya National Highways Authority
2	Reference Number of the Tender	KeNHA/2988/2026
3	Date and Time of Tender Opening	As indicated in the Tender Notice
4	Name of Tenderer	
5	Full Address and Contact Details of the Tenderer	1. Country 2. City 3. Location 4. Building 5. Floor 6. Postal Address 7. Name and email of contact person
6	Current Trade License Registration Number and Expiring date	
	Name, country and full address (postal and physical addresses, email, and telephone number) of Registering Body/Agency	
7	Description of Nature of Business	
8	Maximum value of business which the Tenderer handles	
9	State if Tenders Company is listed in stock exchange, give name and full address (<i>postal and physical addresses, email, and telephone number</i>) of state which stock exchange	

General and Specific Details

b) Sole Proprietor, provide the following details

Name in full _____ Age _____

Nationality _____ Country of Origin _____

Citizenship _____

c) Partnership, provide the following details.

	Name of Partners	Nationality	Citizenship	%Shares Owned
1				
2				
3				

(d) Registered Company, provide the following details.

i) Private or public Company _____

ii) State the nominal and issued capital of the Company-

Nominal Kenya Shillings (Equivalent).....

Issued Kenya Shillings (Equivalent).....

iii) Give details of Directors as follows.

	Name of Directors	Nationality	Citizenship	%Shares Owned
1				
2				
3				

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

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

If yes, provide details as follows.

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

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

f) Certification

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

Full Name_____

Title or Designation_____

(Signature)

(Date)

B. CERTIFICATE OF INDEPENDENT TENDER DETERMINATION

I, the undersigned, in submitting the accompanying Letter of Tender to the KENYA NATIONAL HIGHWAYS

AUTHORITY for: _____
_____[Name of tender]

_____[Tender number]

in response to the request for tenders made by: _____

_____[Name of Tenderer]

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of _____
_____[Name of Tenderer]

that:

1. I have read and I understand the contents of this Certificate;
2. I understand that the Tender will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am the authorized representative of the Tenderer with authority to sign this Certificate, and to submit the Tender on behalf of the Tenderer;
4. For the purposes of this Certificate and the Tender, I understand that the word “competitor” shall include any individual or organization, other than the Tenderer, whether or not affiliated with the Tenderer, who:
 - a) Has been requested to submit a Tender in response to this request for tenders;
 - b) could potentially submit a tender in response to this request for tenders, based on their qualifications, abilities or experience;
5. The Tenderer discloses that [tick one of the following, as applicable]:
 - a) The Tenderer has arrived at the Tender independently from, and without consultation, communication, agreement or arrangement with, any competitor;
 - b) the Tenderer has entered into consultations, communications, agreements or arrangements with one or more competitors regarding this request for tenders, and the Tenderer discloses, in the attached document(s), complete details thereof, including the names of the competitors and the nature of, and reasons for, such consultations, communications, agreements or arrangements;
6. In particular, without limiting the generality of paragraphs (5) (a) or (5) (b) above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - a) prices;
 - b) methods, factors or formulas used to calculate prices;
 - c) the intention or decision to submit, or not to submit, a tender; or
 - d) the submission of a tender which does not meet the specifications of the request for Tenders; except as specifically disclosed pursuant to paragraph (5) (b) above;
7. In addition, there has been no consultation, communication, agreement or arrangement with any competitor regarding the quality, quantity, specifications or delivery particulars of the works or services to which this request for tenders relates, except as specifically authorized by the procuring authority or as specifically disclosed pursuant to paragraph (5) (b) above;
8. the terms of the Tender have not been, and will not be, knowingly disclosed by the Tenderer, directly or indirectly, to any competitor, prior to the date and time of the official tender opening, or of the awarding of the Contract, whichever comes first, unless otherwise required by law or as specifically disclosed pursuant to paragraph (5) (b) above.

Name and Title _____

Date _____

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

C. SELF-DECLARATION FORMS

FORM SD 1: SELF DECLARATION THAT THE PERSON/TENDERER IS NOT DEBARRED IN THE MATTER OF THE PUBLIC PROCUREMENT AND ASSET DISPOSAL ACT 2015

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

1. THAT I am the Company Secretary/ Chief Executive/Managing Director/Principal Officer/Director of
..... (*insert name of the Company*) who is a Bidder in respect of Tender
No.....for.....(*insert tender
title/description*) for..... (*insert name of the Procuring entity*) and duly
authorized and competent to make this statement.
2. THAT the aforesaid Bidder, its Directors and subcontractors have not been debarred from participating in
procurement proceeding under Part IV of the Act.
3. THAT what is deponed to herein above is true to the best of my knowledge, information and belief.

.....
(Title) (Signature) (Date)

Bidder Official Stamp

**FORM SD 2: SELF DECLARATION THAT THE TENDERER WILL NOT ENGAGE IN
ANY CORRUPT OR FRAUDULENT PRACTICE**

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

1. THAT I am the Chief Executive/Managing Director/Principal Officer/Director of.....
..... (insert name of the Company) who is a Bidder in respect of Tender No.
..... for (*insert tender title/description*) for (*insert
name of the Procuring entity*) and duly authorized and competent to make this statement.
2. THAT the aforesaid Bidder, its servants and/or agents /subcontractors will not engage in any corrupt or
fraudulent practice and has not been requested to pay any inducement to any member of the Board,
Management, Staff and/or employees and/or agents of (*insert name of the Procuring entity*)
which is the procuring entity.
3. THAT the aforesaid Bidder, its servants and/or agents /subcontractors have not offered any inducement to any
member of the Board, Management, Staff and/or employees and/or agents of..... (*name of the
procuring entity*).
4. THAT the aforesaid Bidder will not engage/has not engaged in any corrosive practice with other bidders
participating in the subject tender
5. THAT what is deponed to herein above is true to the best of my knowledge information and belief.

.....
(Title)

.....
(Signature)

.....
(Date)

Bidder's Official Stamp

FORM SD 3: DECLARATION AND COMMITMENT TO THE CODE OF ETHICS

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

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

Name of Authorized signatory.....

Sign.....

Position.....

Office address.....Telephone.....

E-mail.....

Name of the

Firm/Company.....

Date.....

(Company Seal/ Rubber Stamp where applicable)

Witness

Name.....

Sign.....

Date.....

APPENDIX 1-FRAUD AND CORRUPTION

(Appendix 1 shall not be modified)

1. Purpose

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

2. Requirements

- 1.2 The Government of Kenya requires that all parties including Procuring Entities, Tenderers, (applicants/proposers), Consultants, Contractors and Suppliers; any Sub-contractors, Sub-consultants, Service providers or Suppliers; any Agents (whether declared or not); and any of their Personnel, involved and engaged in procurement under Kenya's Laws and Regulation, observe the highest standard of ethics during the procurement process, selection and contract execution of all contracts, and refrain from Fraud and Corruption and fully comply with Kenya's laws and Regulations as per paragraphs 1.1 above.
- 1.3 Kenya's public procurement and asset disposal act (*no. 33 of 2015*) under Section 66 describes rules to be followed and actions to be taken in dealing with Corrupt, Coercive, Obstructive, Collusive or Fraudulent practices, and Conflicts of Interest in procurement including consequences for offences committed. A few of the provisions noted below highlight Kenya's policy of no tolerance for such practices and behavior:
 - 1) a person to whom this Act applies shall not be involved in any corrupt, coercive, obstructive, collusive or fraudulent practice; or conflicts of interest in any procurement or asset disposal proceeding;
 - 2) A person referred to under subsection (1) who contravenes the provisions of that sub-section commits an offence;
 - 3) Without limiting the generality of the subsection (1) and (2), the person shall be—
 - a) disqualified from entering into a contract for a procurement or asset disposal proceeding; or
 - b) if a contract has already been entered into with the person, the contract shall be voidable;
 - 4) The voiding of a contract by the procuring entity under subsection (7) does not limit any legal remedy the procuring entity may have;
 - 5) An employee or agent of the procuring entity or a member of the Board or committee of the procuring entity who has a conflict of interest with respect to a procurement—
 - a) shall not take part in the procurement proceedings;
 - b) shall not, after a procurement contract has been entered into, take part in any decision relating to the procurement or contract; and
 - c) shall not be a subcontractor for the bidder to whom was awarded contract, or a member of the group of bidders to whom the contract was awarded, but the subcontractor appointed shall meet all the requirements of this Act.
 - 6) An employee, agent or member described in subsection (1) who refrains from doing

anything prohibited under that subsection, but for that subsection, would have been within his or her duties shall disclose the conflict of interest to the procuring entity;

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

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

- i) Defines broadly, for the purposes of the above provisions, the terms set forth below as follows: "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
- ii) "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;
- iii) "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
- iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
- v) "obstructive practice" is:
 - deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede investigation by Public Procurement Regulatory Authority (PPRA) or any other appropriate authority appointed by Government of Kenya into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or
 - acts intended to materially impede the exercise of the PPRA's or the appointed authority's inspection and audit rights provided for under paragraph 2.3 e. below.
- b) Defines more specifically, in accordance with the above procurement Act provisions set forth for fraudulent and collusive practices as follows:

"fraudulent practice" includes a misrepresentation of fact in order to influence a procurement or disposal process or the exercise of a contract to the detriment of the procuring entity or the tenderer or the contractor, and includes collusive practices amongst tenderers prior to or after tender submission designed to establish tender prices at artificial non-competitive levels and to deprive the procuring entity of the benefits of free and open competition.

- c) Rejects a proposal for award¹ of a contract if PPRA determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- d) Pursuant to the Kenya's above stated Acts and Regulations, may sanction or recommend to appropriate authority(ies) for sanctioning and debarment of a firm or individual, as applicable under the Acts and Regulations;
- e) Requires that a clause be included in Tender documents and Request for Proposal documents

requiring (i) Tenderers (applicants/proposers), Consultants, Contractors, and Suppliers, and their Sub-contractors, Sub- consultants, Service providers, Suppliers, Agents personnel, permit the PPRA or any other appropriate authority appointed by Government of Kenya to inspect² all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the PPRA or any other appropriate authority appointed by Government of Kenya; and

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

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

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

APPENDIX TO FORM OF TENDER

(This appendix forms part of the bid)

Conditions	Sub-Clause	Data
Employer's name and address	1.1.2.2	Director General, Kenya National Highways Authority, P.O. Box 49712 – 00100, <u>NAIROBI</u>
Engineer's name and address	1.1.2.4	Director – Development, Kenya National Highways Authority, P.O. Box 49712 – 00100, <u>NAIROBI</u>
Time for Completion	1.1.3.3	Twenty-Four (24) Months
Defects Notification Period	1.1.3.7	Twelve (12) Months
Site	1.1.6.7	Amala River - Kaplong (B7) Road
Communications	1.3(b)	The Employer's address is: The Director General, Kenya National Highways Authority (KeNHA), P.O. Box 49712 - 00100 <u>NAIROBI</u> The Engineer's address is: The Director, Development, Kenya National Highways Authority (KeNHA), P.O. Box 49712 - 00100 <u>NAIROBI</u> The Contractor address is: Name..... P.O Box..... City/Town..... Email: Telephone.....
Governing Law	1.4	Laws of the Republic of Kenya

Conditions	Sub- Clause	Data
Ruling and communications language	1.4	English
Contract Agreement	1.6	Within the bid validity period
Assignment	1.7	Not applicable
Care and Supply of documents	1.8	One (1) Contract document to be supplied to the Contractor
Right of access to the Site	2.1	Within Twenty Eight (28) days of the Notice of Commencement Date
Performance Security	4.2	The Performance Security shall be in the form of an unconditional Bank Guarantee in the amount(s) of 10% of the Accepted Contract Amount and in the same currency (ies) of the Accepted Contract Amount and submitted by the 28 th day from the date of the letter of acceptance.
Subcontractors	4.4	Maximum of forty per cent (40%) of the permanent works.
Parts of the Works for which subcontracting is not permitted	4.4	N/A
Penalty for not implementing any of the approved ESMP, OSH and Safety Plan.	4.8	Upto Kshs. 50, 000.00 per day to a limit of 3% of the Contract sum.
Progress reports	4.21	Softcopies
Normal working hours	6.5	Weekdays: 8am – 5pm (With 1hour break) Saturdays: 8am – 12 Noon
Commencement of Works	8.1	Fourteen (14) days after order to commence
Programme	8.3	• Electronic through the CPM tool • One (1) Hard copy • Within 28days
Delay damages payable for each day of delay	8.7	0.05% of the Accepted Contract Amount
Maximum amount of delay damages	8.7	5% of the Accepted Contract Amount
Take Over of Parts of the Works	10.2	The employer shall appoint a committee to inspect and accept the works before the Engineer issues the Taking Over Certificate for 50% of the completed road section, including road marking and furniture.

Conditions	Sub-Clause	Data
Provisional Sums	13.5 (b)(ii)	As specified in the Schedule of rates
Adjustment to Changes in cost	13.8	(i) Current indices or prices in the Interim Payment Certificate should be those prevailing on the month when 28 days prior to the last day of the period falls to which a particular IPC is to be released. (ii) In cases, the Contractor failed to complete the works within the “Time of Completion”, CPA calculation thereafter has be made using either (i) each index or price applicable on the date 49 days prior to the expiry of the Time of Completion of the Works, or (ii) the current index or price: whichever is more favorable to the Employer. The weightings (coefficients) for each of the factors of cost stated in the table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variations. (iii) The Price Adjustment provision shall not be applicable if the contract is not completed in time due to the delay caused by the contractor. (iv) The price adjustment will not be applicable if the prices of the construction material increase or decrease with +/- 10% of the base rate. (v) Variation of Price shall be calculated based on each month’s financial statements from the Contractor. Monthly statements shall be taken as the indices prevailing for the month when the first date of valuation period of current IPC fall. In case of negative price escalation, the amount will be deducted from the IPC.
Advance payment	14.2	The Employer MAY pay up to a maximum of 10% of Contract Sum (in installments) after signing of contract, issuance of order to commence and submission of advance payment bank guarantee. NB

Conditions	Sub- Clause	Data
		Upon one month of request by the Employer, the Contractor will be required to submit evidence of utilization of the advance payment for the project as follows: i. Establishment ii. Materials and iii. Equipment Any portion of the advance payment not utilized in accordance to the conditions of this clause SHALL lead to employer recalling the advance payment Guarantee immediately.
Application for interim payment certificates (Statements)	14.3	1 hard copy and 1 soft copy
Percentage of retention	14.3(c)	5% of the Accepted Contract Amount
Limit of Retention Money	14.3(c)	5% of the Accepted Contract Amount
Schedule of payments	14.4	Not applicable
Period of payment of Advance Payment to the Contractor	14.7(a)	Not Applicable
Period for the Employer to make interim payments to the Contractor	14.7b	Ninety (90) days
Period for the Employer to make final payment to the Contractor	14.7(c)	Ninety (90) days
Delayed payment	14.8	Simple interest at a rate equal to two percentage points above the mean Base Lending Rate obtained from the Central Bank of Kenya
Number of additional paper copies of draft Final Statement	14.11	1 hard copy and 1Soft copy
Currencies of Payment	14.15	Kenya Shillings (KES)
Maximum total liability of the Contractor to the Employer	17.6	The accepted contract amount
Periods for submission of insurance	18.1	a. evidence of insurance – 14days b. relevant policies – 28 days
Maximum amount of deductibles for insurance of the Employer's risks	18.2(d)	Not Applicable

Conditions	Sub- Clause	Data
Minimum amount of third party insurance	18.3	Limited to Accepted Contract Amount for each occurrence, with unlimited number of occurrences
Date by which the DB shall be appointed	20.2	As and when required
The DB shall be comprised of	20.2	One Member (ad hoc)
Appointment (if not agreed) to be made by:	20.3	Chartered Institute of Arbitrators (Kenya)
Place and Seat of arbitration	20.6(a)	Nairobi, Kenya

Signature of Tenderer..... **Date**

FORM CON – 1 HISTORICAL CONTRACT NON-PERFORMANCE, PENDING LITIGATION AND LITIGATION HISTORY

Tenderer's Name: _____ Date: _____

JV Member's Name _____

Tender No. _____

Tender title: _____

Non- Performed Contracts in accordance with Section III, Evaluation and Qualification Criteria			
☐ Contract non-performance did not occur for the last three (3) years from the day of tender opening. ☐ Contract(s) not performed for the last three (3) years from the day of tender opening			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (Kenya Shilling equivalent)
[insert year]	[insert amount and percentage]	Contract Identification: [indicate complete contract name/number; and any other identification] Name of Procuring Entity: [insert full name] Address of Procuring Entity: [insert street/city/country] Reason(s) for non-performance: [indicate main reason(s)]	[insert amount]
Pending Litigation, in accordance with Section III, Qualification Criteria and Requirements			
☐ No pending litigation in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 8. ☐ Pending Litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 9 as indicated below			
Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount (Kenya Shilling equivalent)
		Contract Identification: Name of Procuring Entity: Address of Procuring Entity: Matter in dispute: Party who initiated the dispute: Status of dispute:	
Litigation History in accordance with Section III, Evaluation and Qualification Criteria			
☐ No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4. ☐ Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4 as indicated below			
Year of award	Outcome as percentage of Net Worth	Contract Identification	Total Contract Amount (Kenya Shilling equivalent)

FORM CON – 2: DECLARATION FORM – FAIR EMPLOYMENT LAW AND PRACTICES

Date

To

The Director General,

Kenya National Highways Authority (KeNHA),

P.O. Box 49712-00100

NAIROBI

We (name and address)_____

_____ declare the following:

1. Have not been involved in and will not be involved in violation of fair employment laws and practices.
2. THAT what is declared hereinabove is true to the best of my knowledge, information and belief

-----		-----
Name of Bidder's authorized Representative	Signature	Date
(To be signed by authorized representative and officially stamped)		

FORM CON – 3: CERTIFICATE OF BIDDER’S VISIT TO SITE

This is to certify that

[Name/s].....

Being the authorized representative/Agent of [Name of bidder]

.....

.....

participated in the organized inspection visit of the site of the works for the

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD

held on.....day of.....20.....

Signed.....

(Employer’s Representative)

.....

.....

(Name of Employer’s Representative)

.....

(Designation)

NOTE: This form is to be completed at the time of the organized site visit.

FORM FIN – 3.1: FINANCIAL SITUATION AND PERFORMANCE**PART 1**

Tenderer's Name: _____ Date: _____

JV Member's Name _____

Tender No. _____

Tender title: _____

1. Financial data

Type of Financial information (Kenya Shillings)	Historic information for previous <u>5</u> years, _____ (amount in Millions (KSh.))				
	2021	2022	2023	2024	2025
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

2. Sources of Finance

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

No.	Source of finance	Amount (Kenya Shilling equivalent)
1	Letter of line of Credit from a recognized Financial Institution	
2	Bank account balance (demonstrated by bank statements)	

3. Financial documents

The Tenderer and its parties shall provide copies of financial statements for the last **five (5)** years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.1. The financial statements shall:

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

Attached are copies of financial statements for the five (5) years required above; and complying with the requirements

PART 2

Detailed Financial Situation Evaluation

No.	Description	Auditors Assessment 2021	Auditors Assessment 2022	Auditors Assessment 2023	Auditors Assessment 2024	Auditors Assessment 2025	Evaluation Score Award Criteria
1.	Financial Ratios						Max score=4 Marks
a.	Current Ratio= <u>Current Assets</u> Current Liabilities						Current Ratio more than 1 = 1 marks
b.	Debt to Equity Ratio = <u>Total Liabilities</u> Total Equity						Equity Capital Ratio less than 1 = 1 Marks
c.	Working Capital = Current Assets- Current Liabilities						Positive Working Capital = 1 marks
d.	Operating Cash Flow Ratio = Cash Flow from <u>Operations</u> Current Liabilities						Operating Cash- flow more than 1 = 1 marks
2.	Working Capital in KShs.						Working Capital is equal or more than 10% of the bid price = 4 Marks

The above Financial Ratios have to be derived from first Principles from the Audit Statements. The Auditor who has undertaken the analysis has to demonstrate the financial ratios and append his signature and stamp to the Document as below:

The Auditor shall be required to provide his/her workings and demonstrate the source of the workings from the various Audited statements by including the Page Numbers and references of the source of the figures used in the computation of the assigned values.

The Auditor undertaking the above Financial Analysis MUST duly fill the Contact Sheet below in all aspects and attach current annual practising license.

Financial ratios Computed by a Certified Public Accountant:

CPA: Name	
ICPAK Number	
Telephone Number	
Email Address	
Postal Address	
Physical Address	
Contact Person	
Mobile Contact of the Contact Person	
Signature	
Date	
Personal/Corporate Stamp	

Ratios attested by the Company Director:

Director's Name	
ID/Passport Number	
Telephone Number	
Email Address	
Postal Address	
Physical Address	
Signature	
Date	
Personal/Corporate Stamp	

FORM FIN – 3.2: AVERAGE ANNUAL CONSTRUCTION TURNOVER

Tenderer's Name: _____

Date: _____

JV Member's Name _____

Tender No. _____

Tender title: _____

		Annual turnover data (construction only)	
Year	Amount Currency <i>[insert amount and indicate currency]</i>	Exchange Rate (where applicable)	Kenya Shilling equivalent
2021			
2022			
2023			
2024			
2025			
Average Annual Construction Turnover*			

* See Section III, Evaluation and Qualification Criteria.

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

FORM FIN - 3.3: CURRENT CONTRACT COMMITMENTS / WORKS IN PROGRESS

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

Current Contract Commitments					
No.	Name of Contract	Procuring Entity's Contact Address, Tel, Fax	Value of Outstanding Work (Kenya Shilling equivalent)	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [KSh./month]

FORM EXP - 4.1: GENERAL CONSTRUCTION EXPERIENCE

Tenderer's Name: _____

Date: _____

JV Member's Name _____

Tender No. _____

Tender title: _____

Starting Year	Ending Year	Contract Identification	Role of Tenderer
		Contract name: Brief Description of the Works and Services performed by the Tenderer: Amount of contract: Name of Procuring Entity: Address:	<i>Main Contractor/ Subcontractor/ Management Contractor</i>
		Contract name: Brief Description of the Works and Services performed by the Tenderer: Amount of contract: Name of Procuring Entity: Address:	
		Contract name: Brief Description of the Works and Services performed by the Tenderer: Amount of contract: Name of Procuring Entity: Address:	

FORM EXP - 4.2(A): SPECIFIC CONSTRUCTION AND CONTRACT MANAGEMENT EXPERIENCE

Tenderer's Name: _____

Date: _____

JV Member's Name _____

Tender No. _____

Tender title: _____

Similar Contract No..	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor ☐	Member in JV ☐	Management Contractor ☐	Sub-Contractor ☐
Total Contract Amount			Kenya Shillings	
If member in a JV or sub-contractor, specify participation in total Contract amount				
Procuring Entity's Name:				
Address:				
Telephone/fax number				
E-mail:				
Description of the similarity in accordance with Sub-Factor 4.2(b) of Section III:				
1. Amount				
2. Physical size of required Works and Services items				
3. Complexity				
4. Methods/Technology				
5. Construction rate for key activities				
6. Other Characteristics				

FORM EXP - 4.2(B): CONSTRUCTION EXPERIENCE IN KEY ACTIVITIES

Tenderer's Name:

Date:

Tenderer's JV Member Name:

Sub-contractor's Name (as per ITT 33.2):

Tender No. _____

Tender title: _____

All Sub-contractors for key activities must complete the information in this form as per ITT 33.2 and Section III, Qualification Criteria and Requirements, Sub-Factor 4.2.

1. Key Activity No One: _____

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

Information	
Description of key activities in accordance with Sub-Factor 4.2(b) of Section III:	
Earthworks	
Gabion protection works	
Concrete works	
Surface Dressing	
Asphalt Concrete works	
Construction of Footbridge at Bomet	

If applicable

2 Activity No. Two

3.

TECHNICAL PROPOSAL

The Tenderer's Technical Proposal shall include the following elements:

SCHEDULE A. Projected Cash Flow

SCHEDULE B. Site Organizations

SCHEDULE C. Subcontractors

SCHEDULE D. Contractor's Equipment

SCHEDULE E. Initial Tentative Program of Performance

SCHEDULE F. Key Personnel Proposed

Instructions on how to present the various schedules of the Technical Proposal are given on the following pages

SCHEDULE A

Projected Cash Flow

- 1) Tenderers shall tabulate below estimates, based on their preliminary work programme, of:
 - a) On the expenditure side, the value of the work which will be carried out;
 - b) On the revenue side, the net payments to which they will become entitled with due allowance for the advance payment and repayment, materials prepayments, and retention money, but excluding price adjustments for rise and fall and provisional sums for emergency works.
 - c) The projected net cash flow during the contract period.
- 2) The prospective successful Tenderer may be required to submit full details to substantiate his estimates.

Period (Months)	Cost of Routine Maintenance Works	Net Payment to be received	Net Cashflow
1-3			
3-6			
6-9			
9-12			
12-15			
15-18			
18-21			
21-24			
24-27			
27-30			

SCHEDULE B

Site Organization

Tenderers shall give below full particulars of the organization they propose to establish, direct, and administer the performance of the Contract. In particular, Tenderers shall indicate the location of site camps and the resources they intend to allocate to Self-Control Units for planning and monitoring purposes.

1. SITE ORGANIZATION CHART
 - i. ORGANOGRAM
 - ii. SITE ORGANISATION LAYOUTS
 - iii. SITE LOCATION MAP
2. NARRATIVE DESCRIPTION OF SITE ORGANIZATION CHART

SCHEDULE C

SUB-CONTRACTORS / PARTNERS

Tenderers shall list below those parts of the Works and Services which they propose to subcontract, and state the approximate value of those parts and the names and addresses of the proposed subcontractors, if those are known at Tendering stage. Tenderers shall also list other business partners involved in the execution of the contract and their respective roles and responsibilities.

Part of Works /
Services:

Approximate
value:

Name and address of proposed subcontractor / partner:

Part of Works /

Services:

Approximate
value:

Name and address of proposed subcontractor / partner:

Part of Works /

Services:

Approximate
value:

Name and address of proposed subcontractor / partner:

Part of Works /

Services:

Approximate
value:

Name and address of proposed subcontractor / partner:

SCHEDULE D

Contractor's Equipment Form EQU

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

Equipment Information and current status for equipment leased from Government Agencies may be omitted

Item of equipment		
Equipment information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current Location:	
	Details of current commitments	
Source	Indicate source of equipment ☐ Owned ☐ Rented ☐ Leased ☐ Specially manufactured	

Omit the following information for equipment owned by the Tenderer.

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

SCHEDULE E

Initial Tentative Program of Works

To demonstrate a clear understanding of the requirements of the Contract, Tenderers shall provide the following:

- i) A bar chart sub-divided into sections for each road showing the major activities to be carried out for Maintenance Works. The activities shall be shown against time, with linkages shown between related/sequential activities as far as possible and appropriate.
- ii) A bar chart or schedule showing the usage of major plant, including those listed in Schedule D (Contractor's Equipment).

SCHEDULE F

Form PER -1 Key Personnel Schedule

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

Key Personnel

1.	Title of position: Site Agent	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/weeks/months that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>Full time site presence</i>
2.	Title of position: Foreman	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/weeks/months that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>Full time site presence</i>

Countersignature of authorized representative of the Tenderer:

Signature: _____

Date: (day month year): _____

Form PER -2

Resume and Declaration – Key Personnel- (*Resume to be provided in this format*)

Name of Tenderer

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

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

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

Declaration

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

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

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

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

- be taken into consideration during Tender evaluation;
- my disqualification from participating in the Tender;
- my dismissal from the contract.

Name of Key Personnel: *[insert name]*

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Tenderer:

Signature: _____

Date: (day month year): _____

SCHEDULE G

PART I. SCHEDULE OF MATERIALS; -BASIC PRICES

ITEM NO	DESCRIPTION	NAME OF SUPPLIER	COUNTRY OF ORIGIN	UNIT	RATE	
					KSHS	CTS
1.	Cut-back Bitumen MC 30 in bulk			Litre		
2.	Cut-back Bitumen MC 30 in drums			Litre		
3.	Bitumen 80/100 in bulk			Kg		
4..	Bitumen 80/100 in drums			Kg		
5..	Bitumen Emulsion K1-60 in bulk			Litre		
6.	Bitumen Emulsion K1-60 in drums			Litre		
7.	Petrol, Regular Grade			Litre		
8.	Petrol, Premium/ super Grade			Litre		
9.	Automotive Diesel Fuel			Litre		
10.	Industrial Diesel Oil			Litre		
11.	Industrial Fuel Oil			Litre		
12.	Kerosene Fuel			Litre		
13.	Cement			Tonne		
14.	Flex beam Guardrail			Metre		
15.	Gabion Mesh			m ²		
16.	Reinforcing Steel			Tonne		
17.	Lime			Tonne		

I certify that the above information is correct

.....
(Title)

.....
(Signature)

.....
(Date)

The prices inserted above shall be those prevailing 30 days before the submission of Tenders and shall be quoted in Kenya Shillings using the prevailing exchange rates by Central Bank Kenya.

Prices of imported materials to be quoted CIF Mombasa or Nairobi as appropriate depending on whether materials are imported by the tenderer directly or through a local agent.

PART II. SHEDULE OF RATES DERIVATION

A Sample Schedule showing how it should be filled by bidder.

Form for Detailed Breakdown of Cost Comparison																																																																																	
Bill item No.	16-80-001																																																																																
Description	Provide, lay and roll asphalt concrete type 1 (bitumen content 5-6% by weight) as pothole patching and regulation - hot mix.																																																																																
Units	M ³	(Assumed production is 160m ³ per day)																																																																															
Quantity	4,680																																																																																
Rate build up a) Direct cost (DC) i) Unit work Price 1) Material Cost <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Description</th> <th style="width: 10%;">Units</th> <th style="width: 10%;">Quantity</th> <th style="width: 15%;">Market Price</th> <th style="width: 25%;">Amount</th> </tr> </thead> <tbody> <tr> <td>AC Type 1</td> <td>M³</td> <td>1</td> <td>20,900.00</td> <td>20,900.00</td> </tr> <tr> <td colspan="4" style="text-align: right;">Sub Total For Material</td> <td>20,900.00</td> </tr> </tbody> </table> 2) Labour Price <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Personnel</th> <th style="width: 10%;">No. Required</th> <th style="width: 10%;">Rate /day</th> <th style="width: 40%;">Amount</th> </tr> </thead> <tbody> <tr> <td>Skilled Labour overseer</td> <td>2</td> <td>1,800.00</td> <td>22.50</td> </tr> <tr> <td>Skilled Labour - Operator</td> <td>6</td> <td>2,045.00</td> <td>76.69</td> </tr> <tr> <td>Artisans Grade II</td> <td>12</td> <td>1,612.00</td> <td>120.90</td> </tr> <tr> <td>Unskilled labour</td> <td>15</td> <td>873.00</td> <td>81.84</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td colspan="3" style="text-align: right;">Sub Total For Labor</td> <td>301.93</td> </tr> <tr> <td colspan="2">Productivity ratio</td> <td colspan="2"> </td> </tr> </tbody> </table> 3) Machinery <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Machinery type</th> <th style="width: 10%;">No. Required</th> <th style="width: 10%;">Rate /day</th> <th style="width: 15%;">Amount</th> <th style="width: 35%;">Hired/Owned</th> </tr> </thead> <tbody> <tr> <td>Roller</td> <td>1</td> <td>38,720.00</td> <td>242.00</td> <td>Hired</td> </tr> <tr> <td>PTR</td> <td>1</td> <td>29,200.00</td> <td>182.50</td> <td>Hired</td> </tr> <tr> <td>Air Compressor</td> <td>1</td> <td>9,625.00</td> <td>60.16</td> <td>Hired</td> </tr> <tr> <td>Bitumen Sprayer H/Operated</td> <td>1</td> <td>4,400.00</td> <td>27.50</td> <td>Hired</td> </tr> <tr> <td>AC Paver</td> <td>1</td> <td>50,504.00</td> <td>315.65</td> <td>Hired</td> </tr> </tbody> </table>					Description	Units	Quantity	Market Price	Amount	AC Type 1	M ³	1	20,900.00	20,900.00	Sub Total For Material				20,900.00	Personnel	No. Required	Rate /day	Amount	Skilled Labour overseer	2	1,800.00	22.50	Skilled Labour - Operator	6	2,045.00	76.69	Artisans Grade II	12	1,612.00	120.90	Unskilled labour	15	873.00	81.84					Sub Total For Labor			301.93	Productivity ratio				Machinery type	No. Required	Rate /day	Amount	Hired/Owned	Roller	1	38,720.00	242.00	Hired	PTR	1	29,200.00	182.50	Hired	Air Compressor	1	9,625.00	60.16	Hired	Bitumen Sprayer H/Operated	1	4,400.00	27.50	Hired	AC Paver	1	50,504.00	315.65	Hired
Description	Units	Quantity	Market Price	Amount																																																																													
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		<i>Sub Total for Machinery</i>			827.81
		Productivity ratio			
	Sub-total of unit price				
	Sum (1+2+3)	22,029.74			
	ii) Haulage Cost	1,104.49			
Sub-totals of DC	23,131.22				
b) Indirect Cost	2,313.12				
c) Overheads and Profits	6,939.37				
Total Cost Sum (a+b+c) Forwarded to the BoQ (16-80-001)	32,383.71				

SAMPLE

Form for Detailed Breakdown of Cost Comparison

Bill item No.	05-60-004
Description	Fill in hard material (rock fill on selected sections) and compact to 95% MDD (AASHTO T99)
Units	M ³
Quantity	12,810

Rate build up

a) Direct cost (DC)

i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price	
Sum (1+2+3)	

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost

c) Overheads and Profits

Total Cost

Sum (a+b+c)

Forwarded to the BoQ (05-60-004)

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
- This form has been based on the principles of Cost Estimation Manual. The Cost Estimation Manual can be downloaded from the following website: <https://krb.go.ke/downloads>
- The Procuring Entity Own Market rates are published on the website: <https://kenha.co.ke/>

I certify that the above information is correct

.....
(Title)

.....
(Signature)

.....
(Date& Official Stamp)

Form for Detailed Breakdown of Cost Comparison

Bill item No.

08-50-014

Description

Provide and place 150 mm thick concrete class 20/20 as lining for stormwater drains including formwork as directed by the engineer.

Units

M²

Quantity

36,270

Rate build up

a) Direct cost (DC) i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price

Sum (1+2+3)

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost

c) Overheads and Profits

Total Cost

Sum (a+b+c)

Forwarded to the BoQ (08-50-014)

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
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(Signature)

.....
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Form for Detailed Breakdown of Cost Comparison

Bill item No.

12-50-003

Description

Provide, place, spread and compact natural gravel for base

Units

M³

Quantity

44,700

Rate build up

a) Direct cost (DC)

i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price

Sum (1+2+3)

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost

c) Overheads and Profits

Total Cost

Sum (a+b+c)

Forwarded to the BoQ (12-50-003)

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
- This form has been based on the principles of Cost Estimation Manual. The Cost Estimation Manual can be downloaded from the following website: <https://krb.go.ke/downloads>
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Form for Detailed Breakdown of Cost Comparison

Bill item No.	13-50-001
Description	Provide, lay and compact Graded Crushed Stone for Subbase
Units	M ³
Quantity	15,550

Rate build up

a) Direct cost (DC) i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price	
Sum (1+2+3)	

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost	
c) Overheads and Profits	
Total Cost Sum (a+b+c) Forwarded to the BoQ (13-50-001)	

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
- This form has been based on the principles of Cost Estimation Manual. The Cost Estimation Manual can be downloaded from the following website: <https://krb.go.ke/downloads>
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(Signature)

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(Date& Official Stamp)

Form for Detailed Breakdown of Cost Comparison

Bill item No.	14-50-001
Description	Provide, transport, spread, mix and curing cement on natural material or GCS material
Units	Tonne
Quantity	1,980

Rate build up

a) Direct cost (DC) i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price	
Sum (1+2+3)	

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost	
c) Overheads and Profits	
Total Cost Sum (a+b+c) Forwarded to the BoQ (14-50-001)	

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
- This form has been based on the principles of Cost Estimation Manual. The Cost Estimation Manual can be downloaded from the following website: <https://krb.go.ke/downloads>
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(Signature)

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(Date& Official Stamp)

Form for Detailed Breakdown of Cost Comparison

Bill item No.	15-60-004
Description	Provide, transport, spread and roll 10/14 mm precoated chippings on the carriageway and shoulders.
Units	M ³
Quantity	6,280

Rate build up

a) Direct cost (DC) i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price	
Sum (1+2+3)	

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost	
c) Overheads and Profits	
Total Cost Sum (a+b+c) Forwarded to the BoQ (15-60-004)	

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
- This form has been based on the principles of Cost Estimation Manual. The Cost Estimation Manual can be downloaded from the following website: <https://krb.go.ke/downloads>
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I certify that the above information is correct

.....
(Title)

.....
(Signature)

.....
(Date& Official Stamp)

Form for Detailed Breakdown of Cost Comparison

Bill item No.	16-70-002
Description	Provide, transport, lay and roll dense bitumen macadam (DBM) for base as directed by the Engineer
Units	M ³
Quantity	6,000

Rate build up

a) Direct cost (DC) i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price	
Sum (1+2+3)	

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost	
c) Overheads and Profits	
Total Cost Sum (a+b+c) Forwarded to the BoQ (16-70-002)	

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
- This form has been based on the principles of Cost Estimation Manual. The Cost Estimation Manual can be downloaded from the following website: <https://krb.go.ke/downloads>
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(Date& Official Stamp)

Form for Detailed Breakdown of Cost Comparison

Bill item No.	16-80-001
Description	Provide, transport, lay and roll asphalt concrete type 1 (bitumen content 5-6% by weight) as directed by the Engineer
Units	M ³
Quantity	7,507

Rate build up

a) Direct cost (DC) i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price	
Sum (1+2+3)	

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost	
c) Overheads and Profits	
Total Cost Sum (a+b+c) Forwarded to the BoQ (16-80-001)	

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
- This form has been based on the principles of Cost Estimation Manual. The Cost Estimation Manual can be downloaded from the following website: <https://krb.go.ke/downloads>
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I certify that the above information is correct

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(Title)

.....
(Signature)

.....
(Date& Official Stamp)

Form for Detailed Breakdown of Cost Comparison

Bill item No.	20-70-009
Description	Provide and erect non-standard informatory signs: (c) 5 - 8m2 area as per clause 2004 of the special specifications and as directed by the Engineer.
Units	No.
Quantity	20

Rate build up

a) Direct cost (DC) i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price	
Sum (1+2+3)	

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost	
c) Overheads and Profits	
Total Cost Sum (a+b+c) Forwarded to the BoQ (20-70-009)	

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
- This form has been based on the principles of Cost Estimation Manual. The Cost Estimation Manual can be downloaded from the following website: <https://krb.go.ke/downloads>
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I certify that the above information is correct

.....
(Title)

.....
(Signature)

.....
(Date& Official Stamp)

Form for Detailed Breakdown of Cost Comparison

Bill item No.	20-70-039		
Description	Provide, transport, lay, joint and paint (500 mm x 300 mm) raised cast in-situ road straight kerbs (Concrete Class 25/20) including haunching as directed by the Engineer.		
Units	M		
Quantity	5,000		

Rate build up

a) Direct cost (DC) i) Unit work Price

1) Material Cost

Description	Units	Quantity	Market Price	Amount
Sub Total For Material				

2) Labour Price

Personnel	No. Required	Rate /day	Amount
Sub Total For Labor			
Productivity ratio			

3) Machinery

Machinery type	No. Required	Rate /day	Amount	Hired/Owned
Sub Total for Machinery				
Productivity ratio				

Sub-total of unit price	
Sum (1+2+3)	

ii) Haulage Cost

Sub-totals of DC

b) Indirect Cost

c) Overheads and Profits

Total Cost

Sum (a+b+c)
Forwarded to the
BoQ (20-70-039)

Notes:

- Attach current (at least 30 days before tender opening date) proof of cost of materials e.g. Proforma Invoices/quotations.
- This form has been based on the principles of Cost Estimation Manual. The Cost Estimation Manual can be downloaded from the following website: <https://krb.go.ke/downloads>
- The Procuring Entity Own Market rates are published on the website: <https://kenha.co.ke/>

I certify that the above information is correct

.....
(Title)

.....
(Signature)

.....
(Date& Official Stamp)

SCHEDULE H:

BASIC PRICES FOR MATERIALS AND LABOUR

Index Code*	Index Description*	Source Index* of	Base Value and Date*	Bidder's Weighting	Weighting Range
Fixed	Nonadjustable	Civil Cost 2019 Engineering - KNBS 2019 Indices rebased	28 days before tender opening date	0.40	A= 0.40
EQ	Equipment				B= 0.1– 0.25
LL	Labour				C= 0.09 - 0.18
MT	Materials				D= 0.14 - 0.26
TF	Transport & Fuel				E= 0.01 - 0.09
Total				1.0	

Notes:

- The Base year for the indices shall be 2019.
- Variation of Price will be applied on monthly financial statements and will become effective 12 months after commencement of the Works
- The Base year for the indices shall be 2019.
- Tenderer to insert Bidder's weighting coefficients in column 5, within the range specified in column 6, for each index in the table above.
- Entered coefficients should add up to one for use in the variation of price formula below. Refer to FIDIC Clause 13.8: Adjustment for Changes in Cost.

$$P_n = A + B \frac{E_n}{E_0} + C \frac{L_n}{L_0} + D \frac{M_n}{M_0} + E \frac{T_n}{T_0}$$

I certify that the above information is correct.

.....

(Title)

.....

(Signature)

.....

(Date & Official Stamp)

FORM OF TENDER SECURITY - DEMAND GUARANTEE

Beneficiary: _____

Invitation to Tender No: _____

Date: _____

TENDER GUARANTEE No.: _____

Guarantor: _____

We have been informed that _____ (herein after called "the Applicant") has submitted or will submit to the Beneficiary its Tender (hereinafter called "the Tender") for the execution of under Invitation to Tender No. ____ ("the ITT").

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

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

- a) Has withdrawn its Tender during the period of Tender validity set forth in the Applicant's Form of Tender ("the Tender Validity Period"), or any extension there to be provided by the Applicant; or
- b) Having been notified of the acceptance of its Tender by the Beneficiary during the Tender Validity Period or any extension there to be provided by the Applicant, (i) has failed to execute the contract agreement, or (ii) has failed to furnish the Performance Security, in accordance with the Instructions to Tenderers ("ITT") of the Beneficiary's Tendering document.

This guarantee will expire:

- a) if the Applicant is the successful Tenderer, upon our receipt of copies of the contract agreement signed by the Applicant and the performance Security and, issued to the Beneficiary in relation to such contract agreement; or
- b) if the Applicant is not the successful Tenderer, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Applicant of the results of the Tendering process; or (ii) twenty-eight days after the end of the Tender Validity Period.

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

[signature(s)]

PART 2 - WORKS' REQUIREMENTS

SECTION VI - BILLS OF QUANTITIES

PREAMBLE TO BILL OF QUANTITIES

1. The Bills of Quantities shall be read in conjunction with the Instructions to Tenderers, General and Particular Conditions of Contract, Technical Specifications, and Drawings.
2. The quantities given in the Bills of Quantities are estimated and provisional and are given to provide a common basis for tendering. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices tender in the priced Bills of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.
3. The rates and prices tender in the priced Bills of Quantities shall, except in so far as it is otherwise provided under the Contract, include all Constructional Plant, labor, supervision, materials, erection, maintenance, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.
4. A rate or price shall be entered against each item in the priced Bills of Quantities, whether quantities are stated or not. The cost of Items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bills of Quantities.
5. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bills of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.
6. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bills of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bills of Quantities.
7. Provisional Sums included and so designated in the Bills of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with Sub-Clause 13.5 and Clause 13.6 of the General Conditions.
8. The method of measurement of completed work for payment shall be in accordance with general and special specifications.
9. Unless otherwise stated, all measurements shall be net taken on the finished work carried out in accordance with the details shown on the drawings or instructed, with no allowance for extra cuts or fills, waste or additional thickness necessary to obtain the minimum finished thickness or dimensions required in this contract. Any work performed in excess of the requirements of the plans and specifications will not be paid for, unless ordered in writing by the Engineer.
10. "Authorised" "Directed" or "Approved" shall mean the authority, direction or approval of the Engineer.

11. The method of measurement of completed work for payment shall be in accordance with Standard Specification for Road and Bridge Construction of the Ministry of Transport and Communications, 1986.
12. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.
13. General directions and descriptions of work and materials are not necessarily repeated or summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities.
14. Units of Measurement and abbreviations used herein shall have the following meanings:

Unit	Abbreviation	Unit	Abbreviation
cubic meter	m ³ <i>or</i> cu m	millimeter	mm
hectare	ha	month	mth
hour	hr	number	No.
kilogram	kg	provisional sum	P.S.
kilometre	km	square meter	m ² <i>or</i> sq m
lump sum	L.S.	square millimeter	mm ² <i>or</i> sq mm
meter	m	vehicle	veh
metric ton (1,000 kg)	t	week	wk
months	mths	person days	PD
		equivalent hours	EH

The price and rates entered in the Bills of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Constructional plant to be used, labour, insurance, supervision, compliance testing, materials, erection, maintenance of works, overheads and profits, taxes and duties together with all general risks, liabilities and obligations set out or implied in the Contract, transport, electricity and telephones, water, use and replenishment of all consumables, including those required under the contract by the Engineer and his staff.

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD		
SUMMARY OF BILL OF QUANTITIES		
BILL NO.	DESCRIPTION	AMOUNT (KSHS)
1	GENERAL: OFFICE ADMINISTRATION AND OVERHEADS/PRELIMINARIES	
4	SITE CLEARANCE	
5	EARTHWORKS	
7	EXCAVATION AND FILLING FOR STRUCTURES	
8	CULVERT AND DRAINAGE WORKS	
9	PASSAGE OF TRAFFIC	
11	PAVED ROADS - SHOULDER MAINTENANCE AND REPAIRS	
12	NATURAL MATERIAL BASES AND SUBBASE	
13	GRADED CRUSHED STONE SUBBASE AND BASE	
14	CEMENT AND LIME TREATED SUBGRADE, SUBBASE AND BASE	
15	BITUMINOUS SURFACE TREATMENT AND SURFACE DRESSING	
16	BITUMINOUS MIXES	
17	CONCRETE WORKS (MAJOR STRUCTURES)	
19	STEEL STRUCTURES	
20	ROAD FURNITURE REPAIR AND MAINTENANCE	
21	MISCELLANEOUS BRIDGE/DRIFT WORKS	
22	DAYWORKS	
23	PAVED SURFACES	
25	CROSS CUTTING ISSUES	
A	SUB -TOTAL 1	
B	2.5% Contingency of Sub-total 1 for VoP	
C	SUB-TOTAL 2 (A+B)	
D	VAT @ 16% of C	
E	SUB-TOTAL 3 (C+D)	
F	Add: Public Procurement Capacity Building Levy @ 0.03% of Sub Total (2)	
G	TOTAL COST CARRIED FORWARD TO FORM OF BID (E+F)	

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 1	GENERAL: OFFICE ADMINISTRATION AND OVERHEADS/PRELIMINARIES				
ITEM NO.	DESCRIPTION	UNIT S	QUANTIT Y	UNIT BID RATE (KSH)	AMOUNT (KSH)
01-50-019A	Construction of buildings and other structures as per BoQ in Appendix D	Sum		1.00	
01-80-010A	Payment for Material Testing as detailed in the schedule attached in Appendix C as Instructed by the Engineer.	Sum	1,000,000	1.00	1,000,000.00
01-80-011A	Extra over 01-80-010A for profits and overheads.	%	1,000,000		
01-80-012	Allow a prime cost sum for relocation of utilities	PC Sum	20,000,000	1.00	20,000,000.00
01-80-013	Extra over item 01-80-012 for profits and overheads	%	20,000,000		
01-80-017	Provide fuel and maintain with driver 3 No. New 4WD double cabin vehicle (odometer: 0 - 10,000) of diesel Engine capacity not less than 2400cc for exclusive use by the Engineer inclusive of the first 4,000km per vehicle month in accordance with clause 138 of special specification.	V/ Mont hs	90		
01-80-018	Extra over 01-80-017 for mileage over 4,000km	Km	45,000		
01-80-021	Provide fuel and maintain with driver, 1 No. new 4WD Station Wagon vehicle (odometer:0 - 10000) of diesel Engine capacity not less than 2800cc for exclusive use by the Engineer inclusive of the first 4,000km per vehicle month in accordance with clause 138 of special specification.	V/ Mont hs	30		
01-80-022	Extra over 01-80-021 for mileage over 4,000km	Km	15,000		
01-80-026A	Payment of Resident Engineer Miscellaneous Account as detailed in the schedule attached in Appendix B as Instructed by the Engineer.	Sum		1.00	
01-80-030A	Payment of Engineers Supervisory Staff including overtime in accordance with clause 137 of Special Specifications and as per Renumeration Rates in Appendix A as instructed by the Engineer.	Sum	43,474,200	1.00	43,474,200.00
01-80-031A	Extra over 01-80-030A for contractor's profits and overheads	%	43,474,200		
01-80-032	Allow a sum for training of Resident Engineer's staff on site	Sum	4,000,000	1.00	4,000,000.00
01-80-033	Include percentage of sum in item 01-80-032 for contractor's overhead and profit	%	4,000,000		

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 1	GENERAL: OFFICE ADMINISTRATION AND OVERHEADS/PRELIMINARIES				
ITEM NO.	DESCRIPTION	UNIT S	QUANTIT Y	UNIT BID RATE (KSH)	AMOUNT (KSH)
Total Carried Forward to Summary:					
REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 4	SITE CLEARANCE				
ITEM NO.	DESCRIPTION	UNITS	QUANTIT Y	UNIT BID RATE (KSH)	AMOUNT (KSH)
04-50-003	Heavy Bush Clearing	M ²	6,000		
04-60-001	Clear site on road reserve including removal of trees, hedges, bushes and other vegetation or deleterious organic material, grub up roots and back fill to 100% MDD (AASHTO T99) with approved material in accordance with the specification.	M ²	76,750		
04-60-002	Remove topsoil to a depth of 200mm as directed by the Engineer stockpile good material for later topsoiling of sides and landscaping of quarries and borrow pits.	M ³	15,350		
04-60-003	Rip existing pavement subbase and stockpile for reuse or spoil as directed by the Engineer	M ³	15,000		
04-60-005	Removal of existing pipe culverts to spoil or stockpile for re-use as directed by the Engineer	M	150		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 5	EARTHWORKS				
ITEM NO.	DESCRIPTION	UNITS	QUANTIT Y	UNIT BID RATE (KSH)	AMOUNT (KSH)
Note: separate payment shall be made for overhaul material. The cost of such haulage shall be included in the rates and/or prices					
05-50-006	Fill in soft material and compact	M ³	163,600		
05-50-008	Cut to spoil in Soft	M ³	74,400		
05-50-009	Cut to spoil in Hard	M ³	2,800		
05-50-010	Cut to fill in soft material	M ³	2,310		
05-50-016	Scarify, water and compact existing ground to at least 95% MDD (AASHTO T99) to a depth of 200mm below ground level.	M ³	15,400		
05-60-004	Fill in hard material (rock fill on selected sections) and compact to 95%MDD (AASHTO T99)	M ³	12,810		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 7	EXCAVATION AND FILLING FOR STRUCTURES				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
07-60-002	Provide, transport and place gabion boxes and mattresses as specified or as directed by the Engineer	M ²	3,300		
07-60-003	Provide, transport and place rock fill to gabions and mattresses	M ³	600		
07-60-004	Allow for grouting of the rock fill where necessary	M ²	1,200		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 8	CULVERT AND DRAINAGE WORKS				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
08-50-005	Ditch/Mitre drain /catch water drain excavation and spoiling.	M ³	53,700		
08-50-014	Provide, transport and place 150 mm thick concrete class 20/20 as lining for stormwater drains including formwork as directed by the engineer.	M ²	36,270		
08-60-029	Provide, transport, lay and join 1200 mm inner dia concrete pipes including blinding and surround with concrete Class 15/20 as directed by Engineer.	M	198		
08-60-033	Provide, transport, lay and join 600mm inner dia concrete pipes including blinding and surround with concrete Class 15/20 as directed by Engineer.	M	280		
08-60-034	Provide, transport, lay and join 900mm inner dia concrete pipes including blinding and surround with concrete Class 15/20 as directed by Engineer.	M	258		
08-60-037	Provide, transport and place A142 fabric mesh reinforcement	M ²	37,920		
08-70-055	Construct in concrete class 15/20 side drains scour checks as instructed	M ³	50		
08-90-003	Excavation in soft material for pipe culverts, headwalls, wingwalls, aprons, toe walls and drop inlets and compact as specified or as directed by the Engineer	M ³	350		
08-90-008	Provide, transport and place class 15/20 concrete to beds	M ³	900		
08-90-009	Provide, transport and place class 25/20 concrete to headwalls, wing walls, aprons, surrounds to walls, inlets and outlets to pipe culverts including formwork	M ³	240		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 9	PASSAGE OF TRAFFIC				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
09-60-001	Allow for the passage of traffic through the works	Lump Sum		1.00	
09-60-002	Construct, gravel, water, compact and maintain deviation roads in maximum lengths of 10 Km. Allow for minimum width of 6.5m, thickness of gravel 150 mm with minimum CBR 20.	Km	10		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 11	PAVED ROADS - SHOULDER MAINTENANCE AND REPAIRS				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
11-50-002	Prepare surface of existing shoulders, accesses and bus bays, including benching where necessary, water process and compact in accordance with specification and as directed by the engineer to receive gravel.	M ²	21,500		
11-50-003	Provide, transport, place and compact natural gravel to shoulders accesses and bus bays	M ³	6,300		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 12	NATURAL MATERIAL BASES AND SUBBASE				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
12-50-003	Provide, transport, place, spread and compact natural gravel for base	M ³	44,700		
12-70-002	Excavation and spoiling of the existing bituminous layers to any distance where directed by the Engineer	M ³	11,200		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 13	GRADED CRUSHED STONE SUBBASE AND BASE				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
13-50-001	Provide, transport, lay and compact Graded Crushed Stone for Subbase	M ³	15,550		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 14	CEMENT AND LIME TREATED SUBGRADE, SUBBASE AND BASE				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
14-50-001	Provide, transport, spread, mix and curing cement on natural material or GCS material	Tonne	1,980		
14-50-003	Mixing in cement/lime into natural gravel or GCS	M ³	37,400		
14-50-004	Curing and protection of treated layers	M ²	249,400		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 15	BITUMINOUS SURFACE TREATMENT AND SURFACE DRESSING				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
15-60-004	Provide, transport, spread and roll 10/14 mm precoated chippings on the carriageway and shoulders.	M ³	6,280		
15-92-001	Provide, transport and spray MC 30 cut-back bitumen as prime coat to carriageway, shoulders, bus bays and junctions at rate 0.8-1.2 lts/m ² as prime coat	L	299,300		
15-92-002	Provide, transport, heat and spray 80/100 pen grade bitumen for 1 st seal on carriageway, on shoulders, bus bays and junction at rate of 0.9-1.2 lts/m ² .	L	676,800		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 16	BITUMINOUS MIXES				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
16-50-004	Crack Sealing	M	10,000		
16-70-002	Provide, transport, lay and roll dense bitumen macadam (DBM) for base as directed by the Engineer	M ³	6,000		
16-80-001	Provide, transport, lay and roll asphalt concrete type 1 (bitumen content 5-6% by weight) as directed by the Engineer	M ³	7,507		
16-80-003	Provide, transport and spray K-160 as tack coat at a rate of 0.8-1.0 L/sq metre as directed by the Engineer	L	240,900		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 17	CONCRETE WORKS (MAJOR STRUCTURES)				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
17-50-061	Provide, place and compact concrete class 30/20 to foundation bases to piers, columns, wingwall and abutments	M ³	160		
17-60-001	Provide place and compact concrete class 15/20 for blinding	M ³	60		
17-60-003	Provide and fix vertical formwork class F2 finish	M ²	330		
17-60-004	Provide and fix horizontal formwork class F2 finish	M ²	110		
17-60-005	Provide, cut bend and fix into position high yield reinforcement bar to BS 4461 as directed and as shown on the drawing	TON	30		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 19	STEEL STRUCTURES				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
19-50-013	Provide, fabricate, transport and fix mild steel chequered plates of 6 mm thick for decking including 10 mm drain holes as shown in the drawings	M ²	92		
19-50-014	Prepare and apply one primer coat and two coats of gloss paint to general surfaces of metal as per specifications on paint works and as directed by the Engineer	M ²	600		
19-50-021	Provide, fabricate, transport and assemble any structural steel in accordance with the schedule in Appendix E including welding, bolting and galvanization.	Lump Sum		1.00	
19-50-026	Provide M16 grade 8.8 bolts for lateral bracing	No.	52		
19-50-027	Provide M20 anchor bolts	No.	36		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 20	ROAD FURNITURE REPAIR AND MAINTENANCE				
ITEM NO.	DESCRIPTION	UNITS	QTY	UNIT BID RATE (KSH)	AMOUNT (KSH)
20-50-011	Handrail Repair/ Installation	M	200		
20-50-021	Provide, transport and install 200mm dia Steel encased concrete bollards complete with black and yellow reflective paint strips	No.	50		
20-50-031	Provide, transport, lay and joint kerbs, 125mm x 100mm Channels	M	3,460		
20-50-034	Provide, transport and install guard rails complete with posts and Swareflex_ART 3240 guard rails reflectors every 4m as per drawing and as directed by the engineer.	M	10,600		
20-50-067	Provide all materials, transport and construct 200mm wide and 10mm high asphalt concrete rumble strips on the carriageways and shoulders in accordance with the drawings.	M	3,000		
20-50-070	Provide, transport, erect and maintain throughout the contract period publicity signs as per clause 131 of the special specifications and as directed by the Engineer.	No.	2		
20-70-003	Provide, transport and erect warning, mandatory and priority type signs 1000 mm size as per clause 2004 of the special specifications and as directed by the Engineer.	No.	80		
20-70-007	Provide, transport and erect non-standard informatory signs: (b) 1-2 m2 area as per clause 2004 of the special specifications and as directed by the Engineer.	No.	50		
20-70-008	Provide, transport and erect non-standard informatory signs: (b) 2-5m2 area as per clause 2004 of the special specifications and as directed by the Engineer.	No.	30		
20-70-009	Provide, transport and erect non-standard informatory signs: (c) 5 - 8m2 area as per clause 2004 of the special specifications and as directed by the Engineer.	No.	20		
20-70-010	Provide, transport and paint any section of the road as specified using yellow thermoplastic material	M ²	6,230		
20-70-011	Provide, transport and paint any section of the road as specified using white thermoplastic material	M ²	15,010		

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 20	ROAD FURNITURE REPAIR AND MAINTENANCE				
ITEM NO.	DESCRIPTION	UNITS	QTY	UNIT BID RATE (KSH)	AMOUNT (KSH)
20-70-025	Provide, transport and install red, white or yellow retro-reflective delineators (cat eyes) as directed by the Engineer.	No.	2,000		
20-70-027	Provide, transport, plant, water and tender trees seedlings until firmly established as directed by the Engineer.	No.	2,000		
20-70-039	Provide, transport, lay, joint and paint (500 mm x 300 mm) cast in-situ raised road straight kerbs (Concrete Class 25/20) including haunching as directed by the Engineer.	M	5,000		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 21	MISCELLANEOUS BRIDGE/DRIFT WORKS				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
21-60-026	Provide a Prime Cost Sum for mobilization of piling rig and setting up, installing piles to any depth and performing load tests on piles as specified.	PC Sum	10,000,000	1.00	10,000,000.00
21-60-027	Extra over item 21-60-026 for Contractor's overheads and profits	%	10,000,000		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 21	MISCELLANEOUS BRIDGE/DRIFT WORKS				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
22-50-002	Unskilled Labour	PD	1,080		
22-50-104	Excavator - hydraulic crawler or wheel mounted, full circles slew (back actor): a-14.0-17.0 t nominal weight machine	Hr	360		
22-50-142	Lorries -Tipper: c- 17.1 - 25.5t gross vehicle weight	Hr	360		
22-63-018	Backhoe with bucket width sizes 300-900mm. Cat428 or equivalent	Hr	360		
22-68-003	Trailer, Lowbed: 20 - 35 tonnes	EH	100		
22-80-005	Motor Graders (a) 80 - 110kw rated fly wheeled power	Hr	180		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 23	PAVED SURFACES				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
23-50-005	Provide, transport and lay paving blocks 60mm thick including application and compaction of sand after placement	M ²	2,100		
23-50-007	Provide, transport and place 50mm thick sand for precast concrete paving block and slab bases	M ²	2,100		
Total Carried Forward to Summary:					

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD					
BILL OF QUANTITIES					
BILL 25	CROSS CUTTING ISSUES				
ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT BID RATE (KSH)	AMOUNT (KSH)
25-50-001b	Allow a Prime Cost Sum for HIV/AIDS awareness and prevention campaigns	PC Sum	500,000	1.00	500,000.00
25-50-001c	Include % of Prime cost sum in item 25-50-001(b) for contractor's overhead and profit	%	500,000		
25-50-025	Allow a Prime Cost for monitoring of Environment Mitigation measures including NEMA License as directed by the Engineer.	PC Sum	2,500,000	1.00	2,500,000.00
25-50-025A	Extra over for item 25-50-025 for Contractor's profit and overheads.	%	2,500,000		
Total Carried Forward to Summary:					

APPENDIX A FOR ITEM 01-80-030A

PART I

RATES FOR ENGINEERS SUPERVISORY STAFF

NO.	DESIGNATION	KeNHA Grade	Rates	Per Diem - Cluster 1 (Daily)	Per Diem - Cluster 2 (Daily)	Per Diem - Cluster 3 (Daily)	Field Allowance (Daily)	Transport Allowance (Daily)
			Wages & Salaries (Monthly)					
<u>1. Engineers</u>								
1	Resident Engineer (DD)/Deputy Director	3		16,800.00	16,800.00	16,800.00	4200	0
2	Resident Engineer (AD)	4		14,000.00	14,000.00	14,000.00	3500	0
3	Senior Engineer	5		14,000.00	14,000.00	14,000.00	3500	0
4	Engineer	6		11,200.00	11,200.00	11,200.00	2800	0
5	Senior Engineer (Projects)			8,000.00	8,000.00	8,000.00	0	0
6	Engineer (Projects)			8,000.00	8,000.00	8,000.00	0	0
7	Intern Engineer (Projects)			8,000.00	8,000.00	8,000.00	0	0
<u>2. Inspectorate</u>								
1	Roads Superintendent	7		11,200.00	11,200.00	11,200.00	2,800.00	-
2	Roads Inspector	8		11,200.00	11,200.00	11,200.00	2,800.00	-
3	Roads Overseer	9		6,300.00	6,300.00	6,300.00	1,575.00	-
4	Inspector (Projects)			6,300.00	6,300.00	6,300.00	1,050.00	500
5	Assistant Inspector (Projects)			6,300.00	6,300.00	6,300.00	-	500
<u>3. Laboratory</u>								
1	Material Technologist			11,200.00	11,200.00	11,200.00	2,800.00	-
2	Lab Technician			6,300.00	6,300.00	6,300.00	1,575.00	-

3	Lab Attendant			6,300.00	6,300.00	6,300.00	1,575.00	-
4	Lab Technician (Projects)			6,300.00	6,300.00	6,300.00	1,575.00	-
5	Lab Attendant (Projects)			6,300.00	6,300.00	6,300.00	1,575.00	-
4. Survey								
1	Senior Surveyor	5		14,000.00	14,000.00	14,000.00	3,500.00	-
2	Surveyor	6		11,200.00	11,200.00	11,200.00	2,800.00	-
3	Senior Assistant Surveyor	7		11,200.00	11,200.00	11,200.00	2,800.00	-
4	Surveyor (Projects)			6,300.00	6,300.00	6,300.00	0.00	-
5	Assistant Surveyor (Projects)			6,300.00	6,300.00	6,300.00	0.00	-
6	CAD Technician (Projects)			6,300.00	6,300.00	6,300.00	-	-
7	Leveller (Projects)			6,300.00	6,300.00	6,300.00	-	-
8	Chainman (Projects)			6,300.00	6,300.00	6,300.00	-	-
5. Drivers								
1	Senior Driver	8		11,200.00	11,200.00	11,200.00	2,800.00	-
2	Driver	9		6,300.00	6,300.00	6,300.00	1,575.00	-
3	Driver (Projects)			6,300.00	6,300.00	6,300.00	0	-
6. Admin								
1	Senior Officer	5		14,000.00	14,000.00	14,000.00	0	-
2	Officer	6		11,200.00	11,200.00	11,200.00	0	-
3	Senior Assistant Officer	7		11,200.00	11,200.00	11,200.00	0	-
4	Assistant Officer	8		11,200.00	11,200.00	11,200.00	0	-
5	Senior Office Assistant	9		6,300.00	6,300.00	6,300.00	0	-
6	Office Assistant	10		6,300.00	6,300.00	6,300.00	0	-
7	Accountant (Projects)			6,300.00	6,300.00	6,300.00	0	-
8	Assistant Accountant (Projects)			6,300.00	6,300.00	6,300.00	0	-

9	Procurement Officer (Projects)			6,300.00	6,300.00	6,300.00	0	-
10	Assistant Procurement Officer (Projects)			6,300.00	6,300.00	6,300.00	0	-
11	Environmental Officer (Projects)			6,300.00	6,300.00	6,300.00	0	-
12	Assistant Environmental Officer (Projects)			6,300.00	6,300.00	6,300.00	0	-
13	ICT Officer (Projects)			6,300.00	6,300.00	6,300.00	0	-
14	Assistant ICT Officer (Projects)			6,300.00	6,300.00	6,300.00	0	-
15	Human Resource Officer (Projects)			6,300.00	6,300.00	6,300.00	0	-
16	Asst. Human Resource Officer (Projects)			6,300.00	6,300.00	6,300.00	0	-
17	Secretary (Projects)			6,300.00	6,300.00	6,300.00	0	-
18	Office Assistant (Projects)			6,300.00	6,300.00	6,300.00	0	-
19	Office Attendant (Projects)			6,300.00	6,300.00	6,300.00	0	-
20	Casual Laborer (Daily)			1,000.00	1,000.00	1,000.00	0	-
21	Intern			6,300.00	6,300.00	6,300.00	0	-
22	Attachee			6,300.00	6,300.00	6,300.00	0	-
7. Security (Police Officers)								
1	Inspector	8		11,200.00	11,200.00	11,200.00		
2	Senior Sergeant	8		11,200.00	11,200.00	11,200.00		
3	Sergeant	8		11,200.00	11,200.00	11,200.00		
4	Corporal	9		6,300.00	6,300.00	6,300.00		
5	Constable	10		6,300.00	6,300.00	6,300.00		
SUB TOTAL A (Allowances Provision KeNHA Staff for the Contract Duration) =							2,009,700.00	

PART II

KeNHA PROJECT STAFF RENUMERATION SCALE

1. TECHNICAL STAFF

Civil Engineering Degree Holders

S/N o.	Staff Designation	Minimum Qualifications	Gross Monthly Renumeration (Man Months) (KShs)
1	Senior Engineer 1	i. Holds a Degree in Civil Engineering or its equivalent.	206,400.00
		ii. Registered Professional Civil Engineer with EBK and a corporate member of IEK.	
		iii. Has over 3 years post registration experience	
		iv. Has Worked with KeNHA for over 3 years.	
2	Senior Engineer 2	i. Holds a Degree in Civil Engineering or its equivalent.	162,500.00
		ii. Registered Professional Civil Engineer with EBK and a corporate member of IEK.	
		iii. Has Worked with KeNHA for over 3 years.	
3	Engineer 1	i. Holds a Degree in Civil Engineering or its equivalent from an institution recognized by EBK.	117,500.00
		ii. Registered Graduate Civil Engineer with EBK.	
		iii. Has over 5 years Post-Registration Experience in Roads.	
		iv. Has Worked with KeNHA for over 3 years.	
4	Engineer 2	i. Holds a Degree in Civil Engineering or its equivalent from an institution recognized by EBK.	93,500.00
		ii. Registered Graduate Civil Engineer with EBK.	
5	Trainee Engineer/ Intern	i. Holds a Degree in Civil Engineering or its equivalent from an institution recognized by EBK.	25,000.00
		ii. Registered or awaiting Registration as a Graduate Civil Engineer with EBK.	
		iii. Fresh Graduate from University.	

Civil Engineering Diploma Holders

S/N o.	Staff Designation	Minimum Qualifications	Gross Monthly Renumeration (Man Months) (KShs)
1	Superintendent	i. Holds a Diploma in Civil Engineering - Highways Category.	93,500.00

		ii. Has over 6 Years Post graduation Practical Experience in Roads.	
		iii. Has worked with KeNHA for over 4 years.	
2	Inspector	i. Holds a Diploma in Civil Engineering - Highways Category.	71,500.00
		ii. Has over 3 Years Post graduation Practical Experience in Roads.	
		iii. Has worked with KeNHA for over 2 years.	
3	Assistant Site Inspector	i. Holds a Diploma in Civil Engineering - Highways Category.	52,500.00
		ii. Has over 2 Years Post Graduation Practical Experience in Roads.	
4	Lab Technician	i. Holds a Diploma in Civil Engineering - Highways Category.	71,500.00
		ii. Has over 3 Years Post Graduation Practical Experience	
		iii. Has worked with KeNHA for over 2 years.	
5	Assistant Lab Technician	i. Holds a Diploma in Civil Engineering - Highways Category.	52,500.00
		ii. Has over 2 Years Post Graduation Practical Experience	
6	Trainee Site Inspector	i. Holds a Diploma in Civil Engineering - Highways Category.	25,000.00
		ii. Fresh Graduate.	
7	Lab Attendant	i. Has a minimum O Level qualification or equivalent	36,500.00
		ii. Has over 1 year practical experience	

Surveyors

S/N o.	Staff Designation	Minimum Qualifications	Gross Monthly Renumeration (Man Months) (KShs)
1	Surveyor	i. Holds a Degree in Surveying or its equivalent from an institution recognized by ISK	93,500.00
		ii. Registered as a Graduate Member with the Institution of Surveyors of Kenya	
		iii. Has over 3 Years of post registration experience	
2	Assistant Surveyor	i. Holds a Degree in Surveying or its equivalent from an institution recognized by ISK	71,500.00
		ii. Registered as a Graduate Member with the Institution of Surveyors of Kenya	
		iii. Has over 1 year post registration experience	
3	Trainee Surveyor/ Intern	i. Holds a Degree in Surveying or its equivalent from an institution recognized by ISK	25,000.00
		ii. Fresh Graduate from University.	
4	Technician Surveyor	i. Holds a Diploma in Surveying or its equivalent	71,500.00
		ii. Has over 5 Years Post Graduation Practical Experience	

		iii. Has worked with KeNHA for over 2 years.	
5	Assistant Technician Surveyor	i. Holds a Diploma in Surveying or its equivalent ii. Has over 2 Years Post Graduation Practical Experience	52,500.00
6	Chainperson	i. Has a minimum O Level qualification or equivalent ii. Has over 1 year of practical experience in survey	36,500.00

2. NON-TECHNICAL STAFF

Environmental

1	Environmentalist	i. Holds a Degree in environmental science or its equivalent from a recognized institution ii. Registered as a Lead Expert by NEMA	71,500.00
2	Assistant Environmentalist	i. Holds a Degree in environmental science or its equivalent from a recognized institution ii. Registered as an Associate Expert by NEMA	52,500.00

Finance Office

3	Assistant Accountant	i. Holds a Diploma/Degree in Commerce (Finance & Banking) or it's equivalent. ii. Holds atleast CPA-I iii. Has atleast 3 years post graduate practical experience.	52,500.00
4	Trainee Accountant	i. Holds a Diploma/Degree in Commerce (Finance & Banking) or it's equivalent. ii. Fresh from college	25,000.00

Procurement Office

5	Assistant Procurement Officer	i. Holds a Diploma/Degree in Supply Chain Management or its equivalent ii. Has at least 3 years post graduate practical experience.	52,500.00
6	Trainee Procurement Officer	i. Holds a Degree/Diploma in Supply Chain Management or its equivalent ii. Fresh From college	25,000.00

ICT

7	Assistant Information Communications Technology Officer	i. Holds a Diploma/Degree in Computer Science, Information Technology or other relevant and equivalent qualifications from a recognized Institution ii. Has atleast 3 years post graduate practical experience.	52,500.00
8	Trainee Information Communications Technology Officer	i. Holds a Degree/Diploma in Computer Science, Information Technology or other relevant and equivalent qualifications from a recognized Institution ii. Fresh From college	25,000.00

Communication

9	Assistant Communication Officer	i. Holds a Bachelors Degree/Diploma in any of the following: - Journalism, Mass Communications, Public Relations or other relevant and equivalent qualification from a recognized institution.	52,500.00
		ii. Has atleast 3 years post graduate practical experience.	
10	Trainee Communication Officer	i. Holds a Bachelor’s Degree/Diploma in any of the following: - Journalism, Mass Communications, Public Relations or other relevant and equivalent qualification from a recognized institution.	25,000.00
		ii. Fresh From college	
Administration			
11	Human Resource Officer/ Administration Officer	i. Holds a Diploma/Degree in Human Resource or Administration from a recognized institution.	71,500.00
		ii. Has atleast 5 years post graduate practical experience.	
		ii. Has Worked with KeNHA for over 5 years.	
12	Assistant Human Resource Officer/ Administration Officer	i. Holds a Diploma/Degree in Human Resource or Administration from a recognized institution.	52,500.00
		ii. Has atleast 3 years post graduate practical experience.	
13	Trainee Human Resource Officer/ Administration Officer	i. Holds a Diploma/Degree in Human Resource or Administration from a recognized institution.	25,000.00
		ii. Fresh From college	
14	Office Assistant/Clerk	i. Has O-Level Certificate or its equivalent.	36,500.00
		ii. Has over 1 year of practical experience	
SUB TOTAL B =			37,695,000
Provision of a lumpsum to be expended in overtime and allowances in accordance to Labour Laws and Human Resource procedures & guidelines (10% of Sub Total B) =			3,769,500
SUB TOTAL C (SUBTOTAL B + Provisional Sum for Overtime and Allowances) =			41,464,500
GRAND TOTAL CARRIED FORWARD TO BILL 01-80-030A (SUB TOTAL A + SUB TOTAL C) =			43,474,200

APPENDIX B					
KeNHA RE's OFFICE MISCELLANEOUS EXPENSES					
NO.	DESCRIPTION	UNIT	QTY	RATE (Ksh)	AMOUNT (Ksh)
1. Stationaries, Repairs, Safety, Furniture & Consumables					
1	Heavy Duty Photocopier Toner - Kyocera TA 2554ci TK-8345Yellow	No.	3		
2	Heavy Duty Photocopier Toner - Kyocera TA 2554ci TK-8345K Black	No.	6		
3	Heavy Duty Photocopier Toner - Kyocera TA 2554ci TK-8345Cyan	No.	3		
4	Heavy Duty Photocopier Toner - Kyocera TA 2554ci TK-8345Magenta	No.	3		
5	A3 Photocopy Papers (White)	Reams	10		
6	A4 Photocopy Papers (White)	Reams	60		
7	A4 Photocopy Papers (Coloured)	Reams	10		
8	Paper ConquerorA4 (Blue, Cream)	Reams	10		
9	Hot and cold-water dispenser	No.	3		
10	Embossed binding papers	Reams	5		
11	PVC Binding covers	Reams	20		
12	Box Files	Dozen	5		
13	Executive Gel Pen (Parker Roller ball)	No.	10		
14	Ball Pens (Fine point) Assorted colours	Pkts	5		
15	Spirals 1 each (sizes 8mm,10mm,12mm,14mm, 16mm, 18mm,20mm, 24mm, 30mm, 32mm,)	Pkts	20		
16	Highlighters	No.	3		
17	Sticky Notes	No	15		
18	Envelopes Brown - A3	Dozen	11		
19	Envelopes Brown - B4	Dozen	10		
20	Envelopes Brown-A4	Dozen	10		
21	Envelopes Brown-A5	Dozen	11		
22	Highlighting Pens	No.	5		
23	Staple Pins 24/6	Pkts	10		
24	Staple Pins Giant	Pkts	1		
25	Paper Clips (Assorted sizes)	No.	10		
26	Stamp Pad Ink Pelikan (Blue & Red)	No.	2		
27	White Out	No.	1		
28	Cello tape 3 inch	No.	5		
29	Masking tape	No.	3		
30	Binder Clips (Assorted sizes)	Pkts	5		

APPENDIX B					
KeNHA RE's OFFICE MISCELLANEOUS EXPENSES					
NO.	DESCRIPTION	UNIT	QTY	RATE (Ksh)	AMOUNT (Ksh)
31	Glue Stick Pritt	No.	5		
32	Pencils	No.	32		
33	Survey levelling books	No.	12		
34	Engineer's Measuring wheel	No.	3		
35	Artist spray paint standard 400ML	No.	16		
36	Safety boots	Pairs	50		
37	Branded reflectors	No.	60		
38	Branded raincoats	No.	30		
39	Branded hats	No.	40		
40	Branded hoodies	No.	50		
41	HP Z1 G9 Tower Workstation Intel Core i7-14700 Processor 16GB RAM 1TB SSD Integrated Intel UHD 770 Graphics Windows 11 Pro CPU Only& HP P24q G4 23.8" QHD Adjustable Business Monitor VGA & HDMI 1.4 Connectivity (8MB10AA) including keyboard and all accessories	No.	6		
	Subtotal A				
2. Staff Welfare					
1	Kitchen detergents	Litres	100		
2	Milk	Litres	800		
3	Sugar	Kgs	300		
4	Coffee	Kgs	15		
5	Tea	Kgs	30		
6	Milo	Kgs	25		
7	Washing Detergents	Litres	100		
8	Toilet Papers	Dozen	100		
9	White facial tissues (box containing 80x2ply)	Boxes	120		
10	Serviettes	Pkts	600		
11	Air Fresheners (250ml)	No.	60		
12	Scotch Brite	No.	60		
13	Harpic (500ml)	No.	60		
14	Jik bleach (500ml)	No.	12		
15	Jik colours (500ml)	No.	12		

APPENDIX B					
KeNHA RE's OFFICE MISCELLANEOUS EXPENSES					
NO.	DESCRIPTION	UNIT	QTY	RATE (Ksh)	AMOUNT (Ksh)
16	Hand washing gels (Dettol) 250 ml	No.	100		
17	Cleaning Rubber Gloves	No	5		
18	Refillable Drinking water (20LTS) Bottle	No.	100		
	Subtotal B				
3. RE's Office Bills					
NO.	DESCRIPTION	UNIT	QNTY	RATE (Ksh)	AMOUNT (Ksh)
1	1. Provision of office internet 2. Electricity bill 3. Water bill 4. Repairs to RE's office 5. Furniture Repairs 6. Postages 7. Snacks and Lunches 8. Repairs to RE's office equipment 9. Snacks and lunches for the RE's office	Sum	2,000,000	1.00	2,000,000.00
2	Extra over item no. 1 (RE's office bills) for contractor's profits and overheads.	%	2,000,000		
	Subtotal C				
	GRAND TOTAL CARRIED FORWARD TO BILL ITEM 01-80-026A				

APPENDIX C**LABORATORY TESTS**

S/No.	Description	Units	Quantity	Rate	Amount (Kshs)
1	Confirmatory material testing for all materials intended for use in the project, purchase of laboratory equipment and consumables, calibration & repairs of equipment and PPEs as listed below: 1. Tests on aggregates 2. Tests on bituminous materials 3. Tests on soils 4. Tests on paint material including glass beads 5. Tests on guardrails 6. Tests on concrete 7. Purchase of laboratory equipment and consumables 8. Purchase of laboratory PPEs 9. Calibration of laboratory equipment 10. Repairs of laboratory equipment	Sum	1,000,000.00	1.00	1,000,000.00
GRAND TOTAL CARRIED FORWARD TO BILL ITEM 01-80-010A					1,000,000.00

APPENDIX D					
Item	Description	Units	Quantities	Rate	Amount (Kshs)
ELEMENT NO. 1: SUBSTRUCTURE					
	i) Notes: 1. This section comprises all works up to and including the surface bed. 2. Site clearance is included in external works				
1.01	Strip topsoil up to 150mm deep (average) to remove vegetable soil and cart away and deposit as directed.	SM	650		
1.02	Bulky excavation in normal soil to reduced levels for a depth not exceeding 1.50 metres deep.	CM	400		
1.03	Excavate for foundation trench commencing from reduced levels to depths not exceeding 1.5 metres deep.	CM	195		
1.04	Extra over excavation in any position for excavation in rock.	CM	15		
1.05	Allow for keeping the whole of excavation free from water.	ITEM	1		
1.06	Allow for maintaining and upholding sides of excavations clear of all fallen materials, rubbish etc.	ITEM	1		
1.07	Allow, for destroying any white ants nests found in the vicinity of the building or in tunnels exposed during excavations, taking out and destroying queen ants, depositing cyanide lumps in holes and tunnels and filling with ballast or murram well packed and sealed.	ITEM	1		
1.08	Return and properly ram approved fill materials around foundations	CM	400		
1.09	Load and cart away surplus excavated materials from site and deposit as directed	CM	800		
1.1	Provide, lay and compact approved hardcore filling, hand packed and compacted in layers not exceeding 400mm deep.	CM	700		
1.11	Level Surface of Hardcore filling and blind with approved quarry dust ready to receive concrete	SM	650		
1.12	Anti-termite treatment applied on surface of Hardcore	SM	650		
1.13	Single layer 1000-gauge polythene sheeting with 150mm side and end laps laid under surface bed	SM	650		
	CONCRETE WORK				
1.14	50mm thick concrete (1:4:8) blinding in foundation trenches	SM	200		
1.15	Concrete class 20/20 in strip footing	CM	40		
1.16	Reinforcement to strip footings Provide, cut, bend and fix steel reinforcement of diameter equal to or less than 16mm	TON	3		
	Concrete Class 20/20 in: -				
1.17	150mm thick Concrete Floor Bed	CM	130		
	FORMWORK TO				
1.18	Edge of Surface bed 75-150mm high	LM	1,500		
	STEEL FABRIC REINFORCEMENT TO B.S 4483				
1.19	No-A 142 Fabric reinforcement laid in bed	SM	650		
	FOUNDATION WALLING				
	Quarry natural masonry stone walling in cement and sand (1:3) mortar				
1.20	225mm thick Walling including hoop iron in every alternate course	SM	500		

APPENDIX D

Item	Description	Units	Quantities	Rate	Amount (Kshs)
	PLINTHS:				
1.21	20mm thick Cement and Sand (1:3) rendering steel float finished to plinth	SM	8		
1.22	Prepare and apply three coats of black bituminous paint to rendered plinth externally	SM	850		
	Total Carried Forward to Appendix D Summary Page				
ELEMENT NO. 2: SUPERSTRUCTURE					
2.01	Bituminous Felt Damp Proof Course along the Wall (Measured net-no allowance for laps) 200mm wide horizontal layer including levelling bed and setting out & establishing wall position	LM	540		
	MASONRY BLOCK WALLING				
2.02	Quarry dressed masonry block walling in cement and sand (1:3) mortar 200mm thick Walling including hoop iron in every alternate course	SM	1,450		
	CONCRETE WORKS				
2.03	Well Vibrated Reinforced Concrete class 20/20 in: - Beams, slabs, staircases, columns and lintels including the necessary formwork to sides and soffits of the openings appropriately	CM	160		
	STEEL REINFORCEMENT				
	As described including cutting to lengths, bending, hoisting and fixing including all necessary tying wire and spacing blocks				
2.04	Provide, cut, bend and fix steel reinforcement of diameter equal to or less than 16mm	TON	18		
	Total Carried Forward to Appendix D Summary Page				
ELEMENT NO. 3: ROOFING					
REINFORCED CONCRETE FRAME - SUPERSTRUCTURE					
	ROOF				
	TIMBER WORK				
	All structure truss members shall be in seasoned eucalyptus wood and painted two coats of anti-termite solution and shall be tight fixed with top tie beam with 6mm diameter plain bar.				
3.01	100 X 50mm wall plate	M	160		
3.02	100X 50mm timber to rafter and tie beam	M	1,320		
3.03	75x50mm roof purlin	M	1,250		
3.04	200 x 25 mm Fascia board	M	160		
	PREPAINTED G.I AND ALUZINC SHEET METAL ROOFING				
3.05	Gauge 28 "AluZINC", BP760 Box Profiled Sheets (coloured)	SM	650		
3.06	150 mm diameter half round ridge G24 "AluZINC" jointed to match the sheeting	LM	140		
	CEILING FINISHES				

APPENDIX D

Item	Description	Units	Quantities	Rate	Amount (Kshs)
3.07	Provide and fix 75x50mm Brandering on trusses at 600mm c/c to receive ceiling board	LM	2,000		
3.08	10 mm thick waterproof gypsum board suspended at a height of 3000mm above the finished floor level including cornice, metal gridwork and filler	SM	420		
3.09	12mm soft board suspended at height of 2700mm above finished floor level including cornice	SM	120		
	PAINTING AND DECORATION				
	Prepare and apply one layer water-based paint and two layers vinyl matt brilliant white paints internally on:				
3.10	Gypsum Ceiling	SM	420		
3.12	Soft board ceiling	SM	120		
	Knot, Prime and apply undercoat and two coats gloss finish on woodwork externally on:				
3.13	Surfaces 200 - 300mm girth	LM	200		
	RAINWATER HARVESTING				
	Provide, lay, joint and test the following flexible spigot and socket pipe and fittings with rubber ring joints. Rates to include for all jointly materials, cutting wastage and anchorage.				
3.14	Provide and lay 1 NO. plastic Water tank (10,000 litres, KEN Tank or equivalent as will be directed by the supervising engineer) including construction of tank base and taps	NO	1		
3.15	Provide and fix half round gutters 250mm diameter (plastic - 5ft long)	NO	60		
3.16	Provide and fix clips	NO	150		
3.17	Provide and fix end caps	NO	20		
3.18	Provide and fix gutter drop	NO	20		
3.19	Provide and fix 3-inch pipe (6m long)	NO	10		
3.20	Provide and fix 3-inch elbow	NO	20		
	Total Carried Forward to Appendix D Summary Page				
ELEMENT NO. 4: EXTERNAL AND INTERNAL FINISHINGS					
	PAVING AND PLASTERWORK				
	CEMENT AND SAND (1:3) PAVINGS: -				
4.01	75mm paving slabs round the buildings	SM	200		
	External cement render 1:3 on: -				
4.02	Walls	SM	650		
	Internal cement render 1:3 on: -				
4.03	Walls	SM	1,800		
	CONCRETE WORK FAIRFACE FINISH TO: -				
4.04	Concrete surfaces in any position	SM	100		
	PAINTING AND DECORATION				
	Prepare and apply three coats plastic emulsion paint externally on:				

APPENDIX D

Item	Description	Units	Quantities	Rate	Amount (Kshs)
4.05	Rendered walls	SM	1,300		
	Prepare and apply three coats 1st grade plastic emulsion paint internally on:				
4.06	Fair faced walls	SM	1,800		
	INTERNAL FINISHINGS				
	Paving and plaster work cement and sand (1:3) screeds finished to receive floor finishes				
4.07	25mm thick CEMENT SAND mortar to receive tiles.	SM	920		
4.08	Supply and fix wood look tiles in plank like sizes as Saj W 1213 or equivalent including the Sika grout approved, including 150mm high tile skirting	SM	720		
4.09	Supply and fix terrazzo floor tiles on the Laboratory floor as instructed.	SM	120		
4.10	Supply and fix porcelain tiles on the toilets including the Sika grout approved	SM	200		
	Total Carried Forward to Appendix D Summary Page				
ELEMENT NO. 5: DOORS					
	DOORS				
	Timber Doors				
	Provide and install the following purpose made doors complete with frames and fittings				
5.01	50 mm thick semi-solid cored flush door leaf size 820 x 2060 mm overall (plywood Veneered)	No	50		
	IRON MONGERY				
	Supply and fix the following ironmongery with screws to match				
5.02	3 lever mortice dead lock and set furniture	No.	50		
5.03	150mm long barrel bolts	No.	50		
5.04	100mm pressed steel butt hinges	PRS	50		
5.05	Rubber doors stop	No.	50		
	Steel doors				
	Heavy duty mild steel in: -				
5.06	30x1200x2500mm high purpose made casement door including 50x50x3mm thick rebated frame (m.s) plugged all round and to include hinges.	No	3		
5.07	30x900x2500mm high purpose made casement door including 50x50x3mm thick rebated frame (m.s) plugged all round and to include hinges.	No	6		
	Prepare and apply one undercoat and two finishing coats of gloss oil paints on				
5.08	General metal surfaces	SM	48		
	Prepare and apply one undercoat and two finishing coats of 1st grade varnish to wood surfaces				
5.09	General wood surfaces	SM	220		
	Total Carried Forward to Appendix D Summary Page				

APPENDIX D					
Item	Description	Units	Quantities	Rate	Amount (Kshs)
ELEMENT NO. 6: WINDOWS					
	WINDOWS				
	WINDOW CILL				
6.01	150mm x 25mm thick burnt clay window cill jointed in coloured cement mortar	LM	100		
	METALWORK				
	GALVANIZED MILD STEEL				
	Standard windows casements complete with security grills, hinges, stays, fasteners, permanent vent with mosquito gauze and sheet metal hood etc assembled and fixed to opening including cutting and pinning lugs to concrete or blockwork surround and bedding frame in cement and sand mortar (1:4) (lazing excluded), Prime surfaces and apply one undercoat and two coats gloss finish on metalwork				
6.02	Window overall size 2500mm x 1200mm comprising one fixed centre, one opening right and one opening left	SM	100		
6.03	Window overall size 2000mm x 1200mm comprising one fixed centre, one opening right and one opening left	SM	30		
6.04	Window overall size 1200mm x 1200mm comprising one fixed centre, one opening right and one opening left	SM	25		
6.05	Window overall size 600mm x 1500mm comprising one fixed centre, one opening right.	SM	20		
	GLAZING				
	4mm CLEAR SHEET GLASS AND GLAZING				
6.06	5 mm polished plate glass mirror	SM	40		
6.07	To metal with clips and putty in panes 0.10 to 0.50 square metres each	SM	200		
	Total Carried Forward to Appendix D Summary Page				
ELEMENT NO. 7: PLUMBING AND DRAINAGE					
PLUMBING AND DRAINAGE					
	General Toilets				
7.01	Duravit Happy D.2 model No. 070950 pedestal wash basin in white vitreous china size 500 x 360 with overflow and single tap hole and comprising of Ref No. 327566.0 basin, 1No. Chrome plated mixer tap with chrome plated waste extension pipe and wall flange, silicon sealant, and fixings to approval	No	8		
7.02	Stainless steel sink 1000 x 500 mm single bowl single drain including all fittings	No	2		
7.03	Duravit Happy D.2 model No.213409 Close Coupled WC suite in Vitreous china and approved colour comprising of WC bowl,'P' or 'S' trap connector, heavy duty matching seat and cover with metal top fixed chrome plated hinges and chrome plated push button with all the other necessary accessories.	No	12		
	Vitreous china white in colour urinal bowl for one-person, single bowl complete with bowl supports,				

APPENDIX D

Item	Description	Units	Quantities	Rate	Amount (Kshs)
	40mm diameter chrome plated outlet grating, 40mm diameter chrome plated bottle trap. The bowl should be operated with an infrared automatic flush valve as Duravit or equal and approved.				
7.04	Urinal bowls	No	6		
7.05	Touchless automatic Urinal flush valve compatible with the above urinal bowl. The system to operate on a 240V electricity mains and should have all accessories necessary for proper functioning. To be as Giberit Hytronic touchless system MAMBO or equal and approved.	No	6		
	Toilet roll holder in vitreous china to BS 3402 in white colour of size 165x165mm and recessed into wall. Toilet roll holder to be as Duravit or equal and approved				
7.06	Toilet roll holder	No	12		
	Robe hook in vitreous china and in white colour mounted unto a concealed screw to wall wedges, to be as Duravit or approved equivalent.				
7.07	Robe hook	No	24		
	Automatic hand drier in approved color, operating on an infra- red automatic sensing system with safety cut-out complete with plastic rawl plugs and fixing screws. The hand drier to have a heating capacity of 2.1kw and performance flow rate of 135cfm (3.82m3/min) and to be of size 270x264x143mm deep as mediclinic or approved equivalent. approved equivalent.				
7.08	Hand drier	No	12		
	Wall mounted Soap dispenser with a capacity of about one Litre having a press action Soap release mechanism complete with fixing screws. As starmix or approved equivalent				
7.09	Soap Dispenser	No	10		
	INTERNAL PLUMBING				
	To supply and install PPR tubing and fittings which meet requirements described. Tenderers must allow for jointing, clippings, couplings etc, necessary for the proper and satisfactory functioning of the installation when pricing. All joints shall be assembled using solvent cements which shall be approved by the Engineer before use. Rates must allow for all Metal/plastic threaded adaptors where required for connection of sanitary fixtures, valves etc				
	PPR PIPES				
7.10	15mm diameter	M	20		
7.11	20mm diameter	M	40		
7.12	25mm -Ditto-	M	360		
7.13	32mm -Ditto-	M	70		
7.14	40mm -Ditto-	M	18		
	Extra- over PPR pipework for the following.				
	Bends				

APPENDIX D

Item	Description	Units	Quantities	Rate	Amount (Kshs)
7.15	15mm -Ditto-	No.	10		
7.16	20mm -Ditto-	No.	20		
7.17	25mm -Ditto-	No.	100		
7.18	32mm -Ditto-	No.	20		
7.19	40mm -Ditto-	No.	30		
	Threaded fittings				
7.20	15x1/2" dia. female threaded 900 bends	No.	80		
7.21	20x 3/4" ditto	No.	30		
7.22	25x1" ditto	No.	50		
7.23	32x1 1/4" ditto	No.	10		
7.24	40x1 1/2" ditto	No.	10		
	Equal tees				
7.25	15mm equal tee	No.	10		
7.26	20mm ditto	No.	10		
7.27	25mm ditto	No.	75		
7.28	32mm ditto	No.	25		
7.29	40mm ditto	No.	32		
	Reducers				
7.30	20x15mm reducer	No.	8		
7.31	25x20mm reducer	No.	8		
7.32	40x32mm reducer	No.	25		
7.33	Gate valves 40mm approved medium pressure screw down full way non- rising stem wedge gate valve to BS 1952, with wheel and head joints to steel tubing. The gate valve to be as "Pegler" or approved equivalent.	No.	4		
7.34	32mm -ditto-	No.	2		
7.35	25mm -ditto-	No.	2		
7.36	15mm -ditto-	No.	8		
	Unions				
7.37	40mm ditto	No.	30		
7.38	32mm ditto	No.	8		
7.39	25mm ditto	No.	16		
7.40	Allow for pressure testing, flushing out and sterilization of the cold-water system as required to the satisfaction of the Engineer.	Lump Sum	1		
	INTERNAL DRAINAGE				
	All drainage pipes to be as 'Key Terrain or equal and approved equivalent. Allow for connection to the nearest manholes.				
	PVC pipework				
7.41	150mm heavy-duty golden-brown pipe class D	M	42		
7.42	100mm heavy-duty golden-brown pipe class D	M	900		

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Item	Description	Units	Quantities	Rate	Amount (Kshs)
7.43	50mm ditto	M	130		
	PVC pipework				
7.44	50mm diameter sweep Tee	No.	20		
7.45	50mm diameter bend	No.	150		
7.46	100x50mm Boss connector	No.	8		
7.47	100mm diameter single branch	No.	8		
7.48	100mm diameter Double branch	No.	100		
7.49	100 mm diameter WC connector	No.	8		
7.50	100mm diameter 4-way Floor trap and grating	No.	26		
7.51	100mm floor gully complete with cover	No.	12		
7.52	100mm diameter vent cowl	No.	6		
7.53	100mm diameter weathering slate and apron	No.	4		
7.54	Inspection Chamber(manhole)	No.	35		
7.55	Testing and commissioning the internal drainage installations	Ls	1		
7.56	Dry Chemical Powder Fire Extinguisher 9kg dry chemical powder portable fire extinguisher complete with pressure gauge, initial charge and mounting brackets.	No.	6		
7.57	Carbon Dioxide Gas Fire Extinguisher 9kg carbon dioxide gas portable fire extinguisher complete with pressure gauge, initial charge and mounting brackets.	No.	6		
7.58	Fire notices Allow for fire standard signage for the fire exits, extinguishers and fire instructions as to the Engineer's approval.	No.	4		
7.59	9" (225mm) wall mounted manual fire alarm bell	No.	2		
	Trenching Allow for trenching including shoring, keeping excavations free from water and backfilling for pipelines				
7.60	Trenching to a depth of between 500mm - 1000mm as instructed	M	700		
7.61	Trenching to a depth of between 1000mm - 2000mm as instructed	M	40		
	BIO-DIGESTER				
7.62	Allow for installation of a 5m ³ biodigester including all fittings and accessories	NO	1		
	Total Carried Forward to Appendix D Summary Page				
ELEMENT No 8: ELECTRICAL INSTALLATION					
	ELECTRICAL INSTALLATION				
	Original UK make switches, socket & Fittings and Cables to be genuine East Africa Cables Brand				
8.01	12-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	No	1		

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Item	Description	Units	Quantities	Rate	Amount (Kshs)
8.02	6-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	No	4		
8.03	Havells three phase miniature Circuit breakers TP 16, 20, 32A Breaking capacity 10KA	No	100		
8.04	One gang one way switch	No	40		
8.05	Two gang one way switch	No	30		
8.06	Two gang two-way switch	No	25		
8.07	13A Twin socket outlet	No.	100		
8.08	Outlet for television co-axial cable comprising concealed HG PVC conduit square PVC box draw wire and TV outlet plate as MK range.	No.	8		
8.09	Heavy duty 25mm PVC conduits laid in screed or wall chases including all boxes, bends, sandles and accessories	LM	2,100		
8.10	Dimmable LED flush surface mount ceiling light shallow shroud and LED Flat panel box 600mm x 1200mm, 50W output	No	60		
8.11	4 feet LED Fluorescent Fittings	No	45		
8.12	50W LED flood lights	No	12		
8.13	Junction Boxes	No	840		
8.14	1.5mm ² PVC Twin Flat Cable with earth Rolls	LM	2,400		
8.15	2.5mm ² PVC Twin Flat Cable with earth Rolls	LM	3,200		
8.16	Armoured cable 600/1000 volts - 3 core 6943X 10mm ²	LM	700		
8.17	Sealing Chamber G.I. Box	No	8		
8.18	1.5mm ² Tower Clips	Pkts	4		
8.19	2.5mm ² Tower Clips	Pkts	4		
	Communication				
8.20	450 x 450 x 200 mm 14-gauge galvanized compartment communication draw box complete with 3- cover, screws etc.	No.	30		
8.21	Outlet for data/telephone point comprising concealed HG PVC conduit, square PVC box, draw wire and excluding outlet plates.	No.	80		
8.22	Outlet for security points (CCTV and Access control) comprising concealed HG PVC conduit, PVC box, draw wire and excluding outlet plates.	No	20		
8.23	Outlet for Audio visual points comprising concealed HG PVC conduit, PVC box, draw wire and Blanking plate as MK or Crabtree range.	No.	20		
8.24	Double aerial co axial TV/FM wall plate as Crabtree	No.	12		
8.25	Voice/ Data point comprising laying of 25 mm H/G PVC conduits concealed in wall and floor slab complete with all accessories but excluding the RJ45 face outlet plate	No.	70		
	Horizontal cabling				
8.26	RJ45 Cat 6A (Dual) Data/voice outlets complete with faceplates and labelling system as Siemon or equal and approved equivalent	No.	100		

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Item	Description	Units	Quantities	Rate	Amount (Kshs)
8.27	3m RJ45- RJ45 Cat 6A factory terminated patch cord as Siemon or equal and approved equivalent for use at workstation areas	No.	90		
8.28	1m, RJ45- RJ45 Cat 6A factory terminated patch cord as Siemon or equal and approved equivalent to be used in cabinet.	No.	180		
8.29	CAT6A UTP 4-Pair cable as Siemon or approved equivalent drawn in the trunkings to wire both the data and voice points	Lm	1,400		
8.30	TRUNKING 150mm x 50mm x 2.44m Double Compartment Metal Trunking	No.	100		
	Total Carried Forward to Appendix D Summary Page				
ELEMENT NO. 9: PURCHASE OF OFFICE FURNITURE					
9.01	Purchase, transport and installation of Furniture for Resident Engineer's Office	LS	5,000,000	1.00	5,000,000.00
9.02	Allow for Contractor's profits and overheads for item 9.01	%	5,000,000		
	Total Carried Forward to Appendix D Summary Page				

APPENDIX D SUMMARY PAGE					
ELEMENT NO.	DESCRIPTION	AMOUNT (KSHS)			
1	SUBSTRUCTURE				
2	SUPER STRUCTURE				
3	ROOFING				
4	EXTERNAL & INTERNAL FINISHINGS				
5	DOORS				
6	WINDOWS				
7	PLUMBING & DRAINAGE				
8	ELECTRICAL INSTALLATIONS				
9	PURCHASE OF OFFICE FURNITURE				
GRAND TOTAL CARRIED FORWARD TO BILL ITEM 01-50-019A					
APPENDIX E					
STRUCTURAL STEEL WORKS					
ITEM NO	DESCRIPTION	UNIT	QTY	RATE (KSHS.)	AMOUNT (KSHS.)

Nyangores Footbridge					
19.01	Provide and place 2 No. 203x203x46kg/m UC as shown in the drawings	Tonnes	0.28		
19.02	Fabricate and assemble in 150 x 150 x 6.0 mm SHS Hot Rolled SHS sections for top and bottom chords as shown in drawing. Rate to include welding, bolting and galvanization.	Tonnes	4.56		
19.03	Fabricate and assemble in 60x60x4mm Hot Rolled SHS sections for web members as shown in drawing. Rate to include welding, bolting and galvanization.	Tonnes	1.62		
19.04	Fabricate and assemble in 50x50x4mm Hot Rolled SHS sections for runners and diagonal deck bracing as shown in drawing. Rate to include welding, bolting and galvanization.	Tonnes	2.53		
19.05	Fabricate and assemble in 100x50x4 Hot Rolled RHS sections for horizontal deck bracing as shown in drawing. Rate to include welding, bolting and galvanization.	Tonnes	0.71		
19.06	Fabricate and assemble in 65 x 65 x 6mm RSA Hot Rolled equal angle sections for welding to top and bottom chord as shown in drawing. Rate to include welding, bolting and galvanization.	Tonnes	0.98		
19.07	Fabricate and assemble in 50x50x6mm Hot Rolled equal angle sections for lateral load bracing as shown in drawing. Rate to include welding, bolting and galvanization.	Tonnes	0.23		
19.08	Fabricate and assemble in 48x1.5mm CHS Hot Rolled CHS Sections for longitudinal railings as shown in the drawings. Rate to include welding, bolting and galvanization.	Tonnes	0.08		
19.09	Provide 6mm thick gusset plates of different dimensions as shown on drawings	Tonnes	0.04		
19.10	Provide 2 No. 1000x500x18mm anchor plates with bolt holes as shown in drawings. Rate to include all welds and galvanization.	Tonnes	0.24		
19.11	Provide 200x80x8mm plates for bottom and top chord splices as shown in drawings. Rate to include all required welds and galvanization.	Tonnes	0.13		
19.12	Provide 160x50x6 MS Flats for lateral bracing as shown in drawings. Rate to include all required welds, holes and galvanization.	Tonnes	0.01		
19.13	Provide 300x60x6 MS Flats for lateral bracing as shown in drawings. Rate to include all required welds, holes and galvanization.	Tonnes	0.03		
GRAND TOTAL CARRIED FORWARD TO BILL ITEM 19-50-021					

SECTION VII – SPECIFICATIONS

SECTION 1 - GENERAL

100 SPECIAL SPECIFICATIONS

Special specification is supplementary to the Standard Specifications and the two must be read in conjunction. In any case where there appears to be conflict between the two then the Special Specifications shall take precedence

101 LOCATION OF THE PROJECT

The project is located within Bomet County. It starts at Amala River (Mulot), runs through Longisa, Bomet, Kapkwen, Chebole Centres and ends at Kaplong' junction. The total length of the road is approximately 54.4 Km.

The project road traverses a region characterised by heavy rainfall throughout the year.

102 SCOPE OF WORKS

Field investigations have indicated that several pavement sections are being undermined by water ingress from unlined drains, with surface water percolating into the pavement layers rather than being conveyed to designated outfalls, saturating beneath pavement layers and accelerating structural failure.

Additionally, the water table in several problematic sections lie at or near the pavement layers. This problem requires deepening of the side drains and creation of adequate vertical separation between the water table and the pavement layer. Drain excavation and lining works are proposed to intercept and redirect surface runoff to appropriate outfalls at several selected locations along the project road.

Extensive base repairs shall be undertaken on sections exhibiting pavement distress. Works will entail preparation of failed areas and reinstatement of the base course to specifications before laying of the binder course and surface dressing.

To address road safety concern due to increasing pedestrian–vehicle conflicts at Nyangores River bridge near Bomet Town, a pedestrian footbridge shall be constructed at the section. The anticipated benefits of this intervention are significant. The footbridge will eliminate pedestrian–vehicle conflicts. In addition, it will improve mobility and contribute to socio-economic activities along the corridor.

The rapid urbanization and sustained population growth of Bomet Town have placed significant strain on the existing road infrastructure, resulting in increased traffic congestion that impedes the efficient movement of people and goods. The B7 road within Bomet Town shall be dualled. The proposed expansion aims to enhance traffic flow, improve road safety and support the town's continued socio-economic development by providing infrastructure commensurate with its growing demands.

The works to be executed under the Contract comprise mainly but not limited to the following as shall be directed by the Engineer;

1. Provision of preliminaries including construction of office block
2. Protection works using gabions at selected sections
3. Drainage works including excavations, lining and installation of culverts at selected sections
4. Passage of traffic
5. Gravel base and sub-base
6. GCS base and sub-base
7. Cement and lime treatment
8. Pavement strengthening using DBM at selected sections
9. Carriageway overlays and regulations using asphalt concrete at selected sections
10. Carriageway sealing using precoated chippings.
11. Dualling and construction of service roads in Bomet Town.
12. Concrete works
13. Construction of a pedestrian footbridge across the Nyangores River at Bomet
14. Installation of specified road furniture.
15. Dayworks
16. Cross Cutting Issues
17. Any other works as may be instructed by the Engineer

Any other activity not listed above in either category but deemed to be necessary by the Engineer, shall be subject to the Engineer's formal instructions within the mode of payment stipulated either by day works or on a measured basis.

103

CONTRACT DRAWINGS

Contract drawings have been bound in a book of drawings accompanying these Contract Documents as a separate volume. Additional copies of these drawings that may be required by the Contractor can be obtained from the Engineer, in which case the Contractor will be required to reimburse the cost of producing such additional copies

The Engineer may from time to time, to enable the satisfactory completion of the works, revise, amend or supersede any of these drawings. It shall be the Contractor's responsibility to construct all works in conformity with the latest revision, amendment or superseding drawings, provided that the Engineer has given to the Contractor in writing such reasonable prior notices of intention to revise, amend or supersede as the nature of the intended change requires, and the relevant drawings have been issued to the Contractor.

The changed drawings shall entitle the Contractor such reasonable additional payments as provided for in the Contract, including any abortive work carried out by the Contractor prior to notice of intent to undertake changes having been given. The Contractor may be required to demolish, alter and/or correctly rebuild at his own expense any part of the Works not in conformity with the current drawings issued to him within a reasonable prior notice.

Three types of drawings shall be distinguished: Contract drawings; Shop or Erection drawings and As-Constructed drawings as described here under:

Documents

The following manuals that are important and relevant to the contract, will not be issued with the tender documents but will be available for inspection during normal

working hours at the offices of the Director (Highway Planning and Design), Kenya National Highways Authority, P.O. Box 49712 - 0100, Nairobi, Kenya.

Road Design Manual:

Part 1: Geometric Design of Rural Roads

Part 3: Materials and Pavement Design for New Roads

Manual for Traffic Signs:

Part 1: Road Markings

Part 2: Traffic Signs

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PROGRAMME OF EXECUTION OF THE WORKS

The contractor shall provide the works programme, required under clause 8.3 of the Conditions of Contract, within the date stipulated in the Appendix to Form of Bid.

The programme shall be coordinated with climatic and other conditions to provide for the completion of the works in the order and by the time specified.

The Contractor shall carry out the contract in accordance with the programme agreed with the Engineer, but he shall in no manner be relieved by the Engineer's approval of the programme, of his obligation to complete the works in the prescribed order and by the prescribed completion date and he shall from time to time review his progress and make such amendments to his rate of execution of the works as may be necessary to fulfil his obligations.

The Contractor shall allow in his programme for construction of trial sections and carrying out tests upon them as directed by the Engineer in accordance with the provisions of Clause 129 of the Standard Specification. The time for completion of the Contract shall not be extended because of the time taken to carry out tests and evaluate trial sections.

Add the following

The program shall be submitted in both hard copy and electronic format through the scheduling tool.”

105

ORDERS OF EXECUTION OF WORKS

In addition to Clause 105 of the Standard Specification the Contractor shall carry out the Works such that a continuous and consecutive output of fully complete work is achieved.

107

TAKING OVER CERTIFICATE

The minimum length of the road for which a certificate will be issued is 50% of the entire length of a road segment of the project road when substantially completed, as indicated in the Appendix to form of tender.

Add the following sub- Clause.**Notification Terms**

It shall be the Contractor's responsibility to notify the Engineer when any item of works scheduled are completed and ready for approval, and the contractor shall give sufficient notice to allow control test to be performed.

Explosive and Blasting

- (a) The requirements of the Laws of Kenya governing explosives and other requirements and regulations of Government of Kenya and other authorities shall be complied with.
- (b) No explosives of any kind shall be used without prior written consent of the Engineer.
- (c) The Contractor shall be solely responsible for the provision, handling, storage and transporting of all explosives, ancillary materials and all other items of related kind whatsoever required for blasting.

NATIONAL SPECIFICATIONS

Add the following at the end of this clause

"The Contractor shall provide all such specifications not more than 60 days after commencement of contract and at least 14 days before the execution of work to which the specification is applicable."

HEALTH, SAFETY AND ACCIDENTS

Add the following:

In addition to providing, equipping and maintaining adequate first aid stations throughout the works in accordance with the laws of Kenya, the contractor shall provide and maintain on site during the duration of the Contract, a fully equipped dispensary. This shall be with a qualified Clinical Officer / Nurse who shall offer the necessary medical advice on HIV and related diseases to the Engineer's and Contractor's Site staff. The Contractor shall allow for this in the rates and be responsible for all site welfare arrangements at his own cost.

DIVERSION OF SERVICES

- (a) The Contractor shall acquaint himself with the location of all existing services such as telephone lines, electricity cables, water pipes, sewers etc., before execution of any works that may affect the services. The cost of determining the location of the existing services together with making good or repairing of any damage caused all to the satisfaction of the Engineer shall be included in the BID rates.
- (b) Subject to the agreement with the Engineer, the Contractor shall be responsible for removal of alteration and relocation of existing services.
- (c) The Contractor shall indemnify the Employer against claims originating from damage to existing services or works.

123 LIAISON WITH GOVERNMENT AND POLICE OFFICIALS

The Contractor shall keep in close touch with the Police and the other Government officials of the area regarding their requirements in the control of traffic, or other matters, and shall provide all assistance or facilities, which may be required by such officials in the execution of their duties.

124 LAND FOR ALL CAMPS SITES AND FOR THE CONTRACTOR'S OWN PURPOSES, INCLUDING TEMPORARY WORKS.

Notwithstanding Clause 124 of the Standard Specification all requirements of land for temporary works and construction purposes shall be to the approval of the Engineer but the Contractor will make all necessary arrangements with the property owners concerned and pay all charges arising there from. On or before completion of the Contract, the Contractor shall remove all temporary works and shall restore all such land to the condition in which it was immediately prior to the occupation thereof as far as is reasonable and practicable. No separate payment will be made to the Contractor on account of these items and the Contractor must make due allowance for them in his rates.

Notwithstanding Clause 120 of the Standard Specifications, the Contractor shall be required to appoint competent surveyors who will liaise with the Engineer on matters related to the demarcation of the existing road reserve, site measurements, removal and reinstatement of existing services.

125 WATER SUPPLY

Add the following sub-clauses:

The proposed water sources for construction are:

- (a) Boreholes. The quality of water from boreholes along the project road was investigated and found to be suitable for road construction. If instructed by the Engineer, the Contractor shall make arrangements for sinking of the boreholes for use by the contractor and the community. These arrangements shall include but not limited to carrying out hydro geological investigations, sinking the boreholes, construction of supply tanks and all associated works and operation of the boreholes for the period or part of the contract period. The boreholes shall be handed over to the Employer at the completion of the contract
- (b) Water pans constructed at the edge of the road reserve placed appropriately to collect surface runoff during rains at locations proposed by the Contractor and approved by the Engineer to supplement borehole water. These water pans shall be made safe by fencing. A committee of six responsible for developing water sharing guidelines between the local community and the Contractor shall be formed at the onset of the construction works comprising, the Site Agent, the Resident Engineer, Social Expert (from Consultant), 2no. Village Elders and the local Assistant Chief.

127 INFORMATION FROM EXPLORATORY BORINGS AND TEST PITS

Omit the content of Clause 127 and substitute the following Sub-Clauses: -

127.1 Factual Materials Report

The Factual Materials Report for this Contract does not form part of the Contract Documents. However, the Report will be made available for the Contractor's information only, and any conclusions on issues such as suitability of materials, location of borrow pits, material quantities etc., made by the Contractor on basis of the Factual Materials Report, will be at his own risk.

127.2 Trial Sections

The Contractor shall allow in his programme for constructing trial sections and carrying out tests upon them as directed by the Engineer. Trials would normally be required at the start of each pavement layer and if changes of materials, method or equipment deem it necessary as directed by the Engineer.

The time for completion of the Contract shall not be extended because of the time needed to construct trial sections and evaluate the tests on them.

At least fourteen days before the work of laying any pavement layer is commenced, the contractor shall construct trial sections of at least 100 m in length and to the full construction width and the specified pavement layer thickness. For each trial section, the Contractor shall use the materials, mix proportions, mixing, laying, compaction plants and construction procedure that he proposes to use for the main work. The main work of laying the pavement layer shall not be commenced until this trial has been tested and approved by the Engineer.

No variation in the construction procedure, mix proportions, size, grading or source of any of the constituents shall be made without the agreement of the Engineer who may first require new trial sections to be carried out.

Trial sections, if found satisfactory, will be paid for under the rates in the Bill of Quantities for the appropriate items, as if the trial sections were part of the normal work. No separate payment will be made for trial sections and testing and the Contractor shall be deemed to have provided for this in his rates.

The Contractor shall make good, at his own expense, any trial sections that fail to meet the specified standards. The standards shall include, but not be limited to, material quality, layer thickness, levels and compaction.

128 STORAGE OF MATERIALS

All materials shall be stored on Site in a manner approved by the Engineer and the Contractor shall carefully protect from the weather all work and materials which may be affected thereby.

129 TEST CERTIFICATES

When instructed by the Engineer the Contractor shall submit certificates of test from the suppliers of materials and goods required in connection with the works as the Engineer may require.

Such certificates shall certify that the materials or goods concerned have been tested in accordance with the requirements of the specifications and shall give the results of all the tests carried out. The Contractor shall provide adequate means of

identifying the materials and goods delivered to the site with the corresponding certificates.

130 PROGRESS PHOTOGRAPHS AND PROJECT DOCUMENTATION

Notwithstanding the provision of Clause 130 of the Standard Specifications, the Contractor shall not be responsible for taking of progress photographs. Progress Photographs shall be taken by the Engineer's Representative and relevant costs charged to the Contractor who will be reimbursed under Miscellaneous Accounts.

The Engineer's Representative shall organize and undertake project documentation through videography and prepare a video documentary of the project before construction, during and after.

131 SIGNBOARDS

The Contractor shall provide and erect two (2) publicity signs on the site as directed. The Engineer shall, as shown in the Drawings, direct the minimum dimensions and thickness of the steel framework and sheet. The framework and sheet shall be prepared and painted black, while the ring at the top of the supporting frames shall be painted white. The wordings and KeNHA's logo shall be printed on backlit sticker paper resistant to the effects of weather using reflectorized paint or material approved by the Engineer. The colours, fonts and heights of the letters shall be as indicated on the attached drawings and as directed by the Engineer.

(a) After extraction of materials, all borrows pits shall be backfilled to the satisfaction of the Engineer. Borrow pits near the project road shall be backfilled in such a way that no water collects in them.

(b) Spilling of bitumen fuels Oils and other pollutants shall be cleared up.

(c) Including removal of excavated material from the pavement to spoil.

Signboard shall be removed and transported to RE's Yard at the end of Defects Notification Period.

132 HOUSING ACCOMMODATION FOR THE RESIDENT ENGINEER AND HIS STAFF, OFFICE AND LABORATORY INCLUDING FURNITURE

132.1 ENGINEER'S MAIN OFFICE

The contractor shall provide a furnished and equipped main office of plan area not smaller than 155 metre square that is equivalent of the MoPW Standard Resident Engineer's Office. This office shall be of weatherproof construction, provided with mosquito proof and burglar-proof windows and lockable doors and suitably insulated against heat and cold, fitted with air conditioning units, all to the satisfaction of the Engineer. The room to be occupied by the Engineer's Representative and its front office shall be provided with a floor carpet to be approved by the Engineer. All other floors shall be given a PVC tile finish using approved adhesive including 150mm wood skirting or superior finish. The windows shall be fitted with curtains and blinders.

A telephone shall also be provided for the Resident Engineer's office for his exclusive use. All the charges and fees related to the installation, maintenance and

operation of the telephone including provision of internet services shall be deemed to have been included in the rates for providing and maintaining the Main Office.

The offices shall be provided with day and night watchmen and security lights, the cost of which shall be deemed to have been included in the rates for the offices.

The office for the Resident Engineer shall be completely separate from that of the Contractor.

Latrines and washrooms graded to staff seniority, together with a drinkable water supply and waterborne sewage disposal shall be provided for the office. The Contractor shall also provide 24 hours a day security and electricity supply to the offices and shall allow for any water and electricity consumed and for any statutory charges associated.

Measurement and payment for the Engineers office and laboratory shall be as specified in the standard specifications. The rate inserted for provision of the main office shall include the cost of complying with the requirements of clauses 117, 124, 125, 132, 133, 134, 135, 136 and 137 of the standard specifications. The office building shall revert to the Contractor at the end of the project.

The Contractor may be instructed by the Engineer under clause 58 of the General Conditions of Contract to make payments of general receipted accounts for such items as stationery, stores, furniture and equipment, claims and allowances for supervision personnel and any miscellaneous claims or the Engineer may direct the Contractor to purchase or pay for the above. The Contractor will, on provision of receipts, be paid under appropriate bill items in the BoQ.

The Contractor, when instructed, shall provide and install at the Engineer's office the Equipment specified below with a dealer's certificate and warranty:

a) **Photocopying Machine 2No.**

Digital copier with the following minimum specifications:

Color: Black & white

Copy Speed A4: 41 - 50 PPM

Print Speed A3: 20 PPM, A4 – 40PPM

Resolution: 600 x 600 dpi

2 x 500 sheet paper cassettes Standard

200 sheets Multipurpose Bypass Standard

Copier Memory 1024MB Standard Min - (Max 2GB) + 80 GB Standard

Printer Memory 1024MB Standard Min (Max 2GB) + 80 GB Shared with copier

25%- 400% Zoom

Paper size A6 – A3

Recommended monthly volume 6000 copies

Type: Free Standing

b) **Personal Computer (PC) 2 No.**

The rate inserted for the PCs shall include for the provision of the UPS, a Printer and the software specified below for each PC.

1. Processor Intel Core i7 – 2600 (3.4GHZ, 8MB cache, 4 Cores)
2. RAM 16GB - DDR SDRAM
3. Hard Disk SATA, 1 TB, and Min 7200 RPM
4. Display 17” TFT Colour SVGA with NVidia or Radeon graphics accelerator with min 1GB video RAM Motherboard FSB speed: 1GHz
5. Expansion slots 4No.
6. Ports 6 USB ports (minimum)
7. Operating system Windows 10
8. Fully multimedia 4 speed CD ROM 52X (minimum) with sound card and two external speakers 10W minimum.
9. Network Network Ready, Wi-Fi
10. Blu-Ray Drive, not anything less than DVD superdrive 2 years’ warranty less than DVD superdrive 2 years’ warranty

(c) Laptop 8 No.

The rate inserted for the Laptop shall include for the provision of a Printer and the software specified below for each laptop.

- | | |
|-------------------------------|---|
| 1. Processor | Intel Core i7 or higher |
| 2. RAM | DDR SDRAM 1GHz speed, 16GB (minimum) |
| 3. Disk Cache | 1024 MB (minimum) |
| 4. Hard Drive | 1 TB 5400 rpm SATA |
| 5. Video Graphics | NVIDIA GeForce 940M (2GB DDR3Lm dedicated) |
| 6. Keyboard | Full-size island-style backlit with numeric keypad |
| 7. Expansion slots | 1 multi format-SD media card reader, 1 HDMI, 1 headphone/microphone combo, 1 RJ45 |
| 8. Ports | 4 USB ports 3.0 (1 USB Boost) |
| 9. Operating system | Windows 10 |
| 10. Pointing Device | Imagepad with multi-touch gesture support |
| 11. Network card | Integrated 10/100/1000 Gigabit Ethernet LAN |
| 12. Wireless Connectivity | – 802.11a/b/g/n/ac and Bluetooth 4.0 combo |
| 13. Sound | Bang & Olufsen with 4 speakers and 1 subwoofer |
| 14. Optical Drive | SuperMulti DVD burner |
| 15. Two years’ warranty | |
| 16. Battery life, min 6 hours | |
| 17. Built-in webcam, min 2MP | |

Laser jet Printer specifications

- | | |
|------------------|--------------------------------|
| 1. Speed | 20ppm |
| 2. Memory | 32MB expandable to 80MB |
| 3. Resolution | 1200Xx1200dpi |
| 4. Compatibility | MS Windows 95/98/2000/XP/Vista |
| 5. Power input | 220-240V |
| 6. Paper size | A6 – A4 (A3 for 1No. printer) |

1 No. Laptop shall be supplied with a printer capable of printing in A3 paper size. While the rest PCs and laptops to be supplied with A4 LaserJet printers of model Hp2050 or better approved.

UPS specifications

- | | |
|---------------------|--|
| 1. Rating | 650 VAC (minimum) |
| 2. Input Voltage | 220-240V (minimum) |
| 3. Output | 220-240V (minimum) |
| 4. Output frequency | 50-60HZ |
| 5. Battery module | minimum 60 minutes' backup time on 50% rated |
| | a) Sealed Lead-acid |
| | b) Short recharge time (max. 5 hours for 100%) |
| 6. Protection | Output overload
Input output short-circuit |

Software

1. Microsoft Office 2024 Professional or later with licence
2. Autodesk Civil 3D 2024 or later; 4 no. CD and multi user licenses
3. Antivirus: McAfee Virus Scan Professional (Latest Version)

Prior to purchase of the computers, laptops and printers, the contractor shall submit the specifications of the same to the Engineer for approval. The Personal Computers, Laptops, printers, UPSs and Photocopying Machine shall revert to the Employer at the end of the Contract. The contractor shall be paid for these items under appropriate bill items in the BoQ.

LIST OF FURNITURE FOR ENGINEER'S OFFICE

ITEM	DESCRIPTION	No.
1	Executive office desk	2
2	Executive office chair	2
3	Conference table 12 seater	1
4	Standard office desk 2.2x0.9 lockable drawers	6
5	Standard office chairs	3
6	Office desks 1.4x0.9 lockable drawers	10
7	Office chairs	22

ITEM	DESCRIPTION	No.
8	Office desks 3x1 drawers	9
10	Filing cabinets 6 drawers	8
11	Filing cabinets 4 drawers	3
12	Curtains	As applicable
13	Office cupboard	3
14	Refrigerator min. capacity 1.0 m ³	1
15	Water dispenser (hot and cold)	2
16	Waste paper basket	10
17	Stapling machine (ofrex) and pins	3
18	Paper punch	3
19	Scientific calculator (fx 992s)	10
20	Fully equipped first Aid Kit	2
21	Electric heater fans	4
22	Wall clocks battery powered	5
23	Filing trays	12

All furniture and equipment bought under the Contract shall revert to the Employer. Payment for provision of the office **including the furniture mentioned above** shall be paid against the appropriate bill items in the BOQ.

Note: No separate payment shall be made for provision and maintaining of the above furniture for both the RE's office and houses. This will be deemed to have been included in the rate for provision of the same under the appropriate bill items.

132.2 ENGINEER'S LABORATORY AND SURVEY EQUIPMENT

The Contractor shall provide and maintain for the duration of the contract the Engineer's laboratory as shown in the Book of Drawings and provide all the laboratory equipment, reagents and survey equipment as required by the Engineer. The Contractor shall be paid under appropriate bill items in the Bills of Quantities or on provision of receipts as required by the Engineer.

The laboratory shall be sited adjacent to the Resident Engineer's main office and shall revert to the contractor at the end of the contract.

The laboratory shall have piped potable water supply and a continuous electricity supply adequate for lighting, heating and operating the laboratory equipment.

The laboratory shall have a height from floor to ceiling of not less than 2.75 metres and all rooms shall be fitted with electric lighting and power points as instructed by the Engineer's Representative, and each door shall be fitted with a good quality mortise lock and provide with two keys.

Soaking tanks for CBR specimens shall be provided at floor level in the laboratory. Concrete cube curing tanks of adequate size shall also be provided. Both the CBR tanks and concrete cube curing shall have drainage pipes built-in.

The following rooms and facilities shall be provided in the Laboratory: -

(i) Office

This room shall have a total floor area of not less than 14 square metres and a total window area of not less than 2 square meters. The door and windows shall be fitted with fly screens covered with mosquito gauze. The floor shall be of concrete with a float finish. The walls shall be lined and ceiling provided.

A display board of soft board or similar approved material, with a minimum surface area of 3 square metres shall be provided and securely fixed to the wall.

(ii) Main Laboratory

This room shall have a total area of not less than 55 square meters and a total window area of not less than 7 square metres. The external entrance shall be a double door and single doors shall be provided for access to the adjacent offices. The external door and all windows shall be fitted with fly screens covered with mosquito gauze.

The floor shall be of concrete and float finished. The room shall be fitted out as indicated by the Engineer's Representative with three rigidly constructed work benches each minimum 2 metres long by 1-metre-wide by 1 metre high and with top comprising either metal lined hard wood or steel float finished concrete at least 75mm thick and suitably reinforced, with a sink minimum size 600mm long by 450mm wide by 300mm deep fitted with a tap and waste pipe. Wall shelves, 450mm in width and having a surface area of at least 6 square metres, shall be provided and securely fitted.

Two display boards of soft board or similar approved material, each with minimum area of 3 square metres, shall be securely affixed to the walls as directed by the Engineer's Representative.

(iii) Small Laboratory Room

This room shall have a total floor area of not less than 20 square metres and a total window area of not less than 2 square metres. The windows shall be fitted with fly screens covered with mosquito gauze. A single door shall provide access to the main laboratory room. The floor shall be fitted out as indicated by the Engineer's Representative with two rigidly constructed work benches each of minimum dimensions 2 metres long by 1-metre-wide by 1 metre high with a top comprising either metal lined hardwood or a steel float concrete finish of at least 75mm thickness and suitably reinforced, with a sink of minimum size 600mm long by 450mm wide by 300mm deep fitted with a tap and waste pipe and concreted to the water supply for the main laboratory room. An approved air extractor fan shall be fitted through an outside wall.

(iv) Store Rooms

These rooms having a total floor area of not less than 20 square metres shall be provided adjacent to the main laboratory building in a position to be indicated by the Engineer's Representative.

(v) Concrete Slab for Sample Drying

A reinforced concrete slab 100mm thick and of total area not less than 20 square metres shall be provided adjacent to the main laboratory building in a position to be indicated by the Engineer's Representative. The slab shall have a smooth finish to the satisfaction of the Engineer.

The contractor may be directed to pay for stationery, equipment or reagents that are foresaid and also pay for servicing and repair of the laboratory equipment being used on the project.

The equipment shall be of approved manufacture, and shall be made available to the Engineer for the Engineer's exclusive use throughout the Contract, not later than three (3) weeks after the Engineer's order to supply. All equipment shall be ready to use and complete to perform the tests. The equipment shall revert to the Employer on completion of the Contract

Any delays to the Contractor or the Contractor's activities caused by the Engineer being unable to perform survey work, field or laboratory tests due to the contractor's failure to supply and/or maintain the said equipment shall be deemed to have been caused entirely by the Contractors own actions, and any consequences of such delays shall be interpreted as such.

The payment to comply with this requirement is provided in the Bill of Quantities and ownership of all equipment shall revert to the Employer after the completion of the Works.

Failure by the Contractor to provide or maintain the equipment shall make him responsible to bear all costs that may be incurred as a result of the Engineer's staff using alternative means of communication, including delays in supervision and approval of Works by the Engineer.

132.3 MOBILE PHONES FOR ENGINEER'S STAFF AND OFFICE

The Contractor shall, if so instructed by the Engineer provide, connect and maintain mobile phones for the exclusive use by the Engineer and for the duration of the contract. The Contractor shall provide air-time for these mobile phones as directed by the Engineer and be reimbursed under appropriate items in the Bills of Quantities.

133 TIME FOR ERECTION OF THE ENGINEER'S OFFICE AND LABORATORY

As per standard Specifications

135 MAINTENANCE OF THE ENGINEER'S STAFF HOUSES, OFFICES LABORATORIES, FURNITURE AND EQUIPMENT

Until the issue of the Taking-over certificate for the whole of the Works, and if required for a period thereafter until the Contractor has completed any outstanding work."

135.1 Provision of Maintenance and Security

The Contractor shall maintain all furniture and equipment provided by him in a useable state of repair and shall replace promptly any item that becomes unserviceable or is lost.

The Contractor shall provide cleaners, grounds men, and day and night watchmen for housing camp and offices as directed or instructed by the Engineer on site, the cost of which shall be included in the rates for providing houses, offices and laboratory.

Additional armed security shall also be provided as instructed by the Engineer and payment done under the appropriate item in the Bill of Quantities.

137 ATTENDANCES UPON THE ENGINEER AND HIS STAFF

The Contractor shall pay wages (including all overtime) and provide housing for all attendant staff to fulfill the requirements of Clause 137 of the Standard Specifications. Such payments shall be made **NOT LATER** than the **5th day** of the subsequent month. Failure to make prompt payment will result in a surcharge of 10% on the amount due.

The number of junior support staff required by the Engineer shall be as indicated in the Bill of Quantities or as instructed by the Engineer. The Contractor will be paid on a prime cost basis plus a percentage for overheads and profits under appropriate items in the Bills of Quantities. The payment referred to in this clause shall exclude the cost of maintaining the offices in compliance with clause 137, paragraphs 1, 2 and 4 of the standard specifications which are deemed to be included in the rates for providing the Office.

138 VEHICLES AND DRIVERS FOR THE ENGINEER AND HIS STAFF AND METHOD OF PAYMENT

The Contractor shall **when instructed** to do so provide and maintain in good working condition for the exclusive use of the Engineer and his staff throughout the contract, brand new vehicles, as described in the Bill of Quantities.

The Contractor shall insure comprehensively the vehicles for any licensed drivers and shall provide competent drivers during normal working hours and whenever required by the Engineer including recognized days of rest.

Should any vehicle supplied not be in road worthy condition, the Contractor shall provide an acceptable equivalent replacement vehicle until such time as the original vehicle is repaired to the satisfaction of the Engineer and returned for use.

Payment for the vehicles (up to 4,000Km per veh.month), shall be by vehicle months. Payment for mileage above 4,000Km per vehicle month, shall be made at a rate per Kilometre. These payments shall be inclusive of all fuels, lubricants, servicing, insurance, maintenance, drivers and repairs. The rate shall include any overtime the drivers might be due or any other allowances in addition to the normal working hours. Payment shall be made under appropriate items in the Bills of Quantities.

The vehicles shall revert to the Contractor at the end of the contract.

RECEIPTED ACCOUNTS

The Contractor may be instructed by the Engineer to make payments of general miscellaneous accounts for such items as stationary, stores and equipment and miscellaneous supervision personnel and claims or the Engineer may direct the Contractor to purchase or pay for the above. The Contractor will be paid on a prime cost basis plus a percentage for overheads and profits under appropriate items in the Bills of Quantities.

PAYMENT OF OVERTIME FOR ENGINEER'S JUNIOR STAFF

In the last line delete the words "shall be at the Contractor's expense" and substitute with "including the approved percentage for administrative overheads shall be paid by the Contractor to the Engineer".

If the Contractor wishes to execute permanent works outside the Engineer's normal working hours as stated in Clause 45.1 of the Conditions of Contract, then the payment for overtime for the Engineer's junior staff shall be reimbursed in full by the Contractor to the Engineer plus a 20 percent additional amount to cover for the Engineer's administrative overheads.

If the Contractor wishes to execute the works on regular basis outside the Engineer's normal working hours, over a prolonged period, the Engineer may, if he deems it necessary, employ additional supervisory staff for which the required salaries, plus twenty (20%) percent additional amount to cover for the Engineer's administrative overheads shall be reimbursed in full by the Contractor to the Engineer. In addition, the Contractor shall provide the required accommodation for such staff at his own cost. The Contractor shall not be reimbursed any of these costs.

MEASUREMENT AND PAYMENT

Delete Sub-Clause 141 (a) entirely and substitute with: -

- a) No Preliminary item has been included in this Contract. All Contractor's mobilization and general costs shall therefore be included in relevant rates in the Bill of Quantities.

Delete Sub-Clause 141 (m) entirely

ENVIRONMENTAL PROTECTION

Further to the requirements of Clause 19.1 of the Conditions of Contract, the Contractor shall be responsible for the following measures to protect the environment:

- 1) Compliance with national and local statutes and regulations relating to protection of the environment. The Contractor will be responsible for familiarizing himself with all existing national and local legislation in this regard.
- 2) All construction activities shall be carried out using the best possible means to reduce environmental pollution such as noise, dust and smoke. All vehicles and plant shall be regularly serviced in accordance with the manufacturer's recommendations to ensure that they operate efficiently and without excessive noxious emissions. The Engineer will have the authority to instruct the

Contractor to temporarily cease operations and/or remove from the site vehicles or plant which do not comply with this requirement, until such time that he is satisfied that best practicable means to reduce environmental pollution to a minimum are being used.

- 3) The Contractor shall at all times maintain all sites under his control in a clean and tidy condition and shall provide appropriate and adequate facilities for the temporary storage of all waste prior to proper approved disposal.
- 4) The Contractor shall be responsible for the safe transportation and disposal of all waste generated as a result of his activities in such a manner as will not give rise to environmental pollution in any form, or hazard to human or animal health. In the event of any third party being employed to dispose of waste, the Contractor shall be considered to have discharged his responsibilities under this clause from the time at which waste leaves sites under his control, providing that he has satisfied himself that the proposed transportation and disposal arrangements are such as will not give rise to pollution or health hazard.
- 5) The Contractor shall be responsible for the provision of adequate sanitary facilities for his workforce, and that of his sub-contractors, at all construction and ancillary sites. The Contractor shall not allow the discharge of any untreated sanitary waste to groundwater or any surface watercourse.

Prior to the mobilization of the workforce the Contractor shall provide details of proposed sanitary arrangements to the Engineer for approval, such as will allow him to assess whether or not the proposed facilities are adequate and are unlikely to pollute water resources, and also that the facilities will be properly operated and maintained.

- 6) All concrete and asphalt plants shall be operated and maintained in accordance with the original manufacturer's specifications and manuals, and in such a manner as to minimize emissions of hydrocarbons and particulates. If, in the opinion of the Engineer, the operation of such plant is causing, or is likely to cause nuisance or health problems to site staff or the general public, the Contractor shall carry out such work as is necessary to reduce emissions to an acceptable level within a time-scale agreed with the Engineer.
- 7) The Contractor shall regularly douse with water all exposed dirt surfaces to reduce dust levels.
- 8) The Contractor shall take all reasonable measures, at all sites under his control, to prevent spillage and leakage of materials likely to cause pollution of water resources. Such measures shall include, but not be limited to the provision of bunds around fuel, oil and bitumen storage facilities, and provision of oil and grease traps for servicing and fuelling areas. Prior to construction of such facilities, the Contractor shall submit details of pollution prevention measures to the Engineer for his approval.
- 9) The Contractor shall be responsible for ensuring that exposed surfaces are re-vegetated as construction progresses, all to the satisfaction of the Engineer.
- 10) The removal of trees shall be kept to the minimum necessary to accommodate the Permanent Works.

Prior to the removal of any trees the Contractor shall inform the Engineer of the intended operation and obtain the permission of the Engineer for the

removal of the trees. If any tree is removed without permission the Contractor shall replant another approved tree at no additional cost to the Employer.

- 11) The Contractor shall ensure that fires, except for controlled fires for burning rubbish, do not start within the Site or in the environs thereto as a result of the works or from the actions of his employees. The burning of waste, such as vehicle tyres causing noxious emissions is prohibited. The Contractor shall have available at all times trained fire-fighting personnel provided with adequate fire-fighting equipment to deal with all fires. The Contractor shall additionally at all times provide sufficient fire protection and fighting equipment local to parts of the Works which constitute particular fire hazards.
- 12) The contractor shall as instructed by the Engineer carry out off – road mitigation measures to the approval and satisfaction of the Engineer and to the required standards. The contractor shall obtain Environmental mitigation license for the same and also comply with Environmental Management Coordination Act (EMCA) 1999, and Environmental Impact Assessment (EIA) and Environmental Audit (EA) Regulations 2003.

No separate payment shall be made in respect of this Clause 142 and the Contractor shall be deemed to have allowed in his general rates and prices for the cost of complying with the requirements of this Clauses.

144 COPIES OF ORDERS AND REQUISITIONS

The Contractor shall provide the Engineer with copies of all orders for supply of materials and goods required in connection with the works as the Engineer may require.

145 SHORTAGE OF BITUMEN AND OTHER MATERIALS

The Contractor shall make provisions for obtaining bitumen and other materials required for the Contract if they are not available locally. In particular, the Employer shall not be liable for any additional costs due to local lack of bitumen or any other materials.

146 BASELINE STUDIES FOR SOCIAL AND ECONOMIC IMPACT STUDIES

This specification sets out the Contractor's obligations with regard to instituting a baseline study for social and economic impact for the project within the area.

146A GENERAL REQUIREMENTS

(a) Social and Economic impact studies

The Contractor shall institute Social and Economic impact studies through a consultant so as to conduct a baseline survey, midterm evaluation and impact evaluation to all the component of the project.

The exercise in baseline survey and impact evaluation will be carried out in coordination with the Authority's for capacity development and technical assistance.

(b) Objective

The objective of the assignment is to establish baseline data on the agreed indicators between the Authority and the consultant in reference to the project appraisal result framework covering the project road section and other impact areas. The baseline data will be monitored bi-annually during project implementation and evaluated at midterm and end term.

Thereafter using the collected data the project will be subjected to impact evaluation assess the benefits and draw lessons learnt from the project.

The impact study findings shall be used for planning and packaging future projects and guiding the impact assessment on target groups. The specific tasks for the consultancy services on the study shall include:

(c) Scope of the Study

Road development or improvement is geared towards improving the general welfare of the country and directly to the communities within the project impact area. To quantify change with respect to the project intervention to address the identified issues such as inadequate transport capacity, road crashes and high road user cost along Project road and its environs, the consultant shall conduct a study to document the current status on the identified socioeconomic information or pillars, carrying a follow up surveys to analyze the pre and post-intervention change at mid-term (after 2 years of implementation or 50% time elapse of contractual work project whichever is earlier) and end term evaluation of the project (1-2 years after project completion), the consult will incorporate the non – project area Project road section as a controlled section to assist in comparative analysis at the end of the project.

The end-line survey for project impact study is expected to develop household and community questionnaires, focus group interviews and key informant discussions for quantitative impact evaluation, and implement the survey in the field (must refer the baseline survey questionnaire).

All survey instruments should be based on a thorough review of relevant literature and existing questionnaires, such as the Kenya Census Survey 2019, Kenya Integrated Household and Budget Surveys (KIHBS), Demographic and Health Surveys (DHS) and the Micro, Small and Medium Enterprise Study. The end-line survey should, therefore, be designed to capture not only project outputs (e.g. roads length built, employment etc) and outcomes (e.g. market prices, agricultural productivity, access to markets and services, travel times, traffic volume and travel costs) but also impacts/final welfare outcomes (e.g. income/expenditure, health and women's empowerment) and institutional capacity development in the Authority under training component.

Contractor Responsibilities

The Contractor will employ and designate a qualified Consultant to be approved by the Engineer, who will work closely with the Client and other relevant bodies so as to undertake the exercise.

Reporting

The Consultant shall prepare a draft report which shall summarize the findings, analysis, results and recommendations of the socio-economic baseline and shall contain all supporting materials to be submitted as will be directed by the Engineer. The Consultant will therefore be required to make adequate provision for documentation at Inception, during midterm and Final End Term report.

Payment

Payment shall be made as per the program approved by the Engineer.

SECTION 2 - MATERIALS AND TESTING OF MATERIALS

All materials testing shall be in accordance with Section 2 of the Standard Specifications.

205 SOILS AND GRAVEL

Whenever in the Contract Document a minimum California Bearing Ratio (CBR) is specified, the CBR of the material shall be determined at the specified state of compaction;

- a) After four days soaking in the case of neat materials and
- b) After seven days curing plus seven days soaking in the case of cement/lime improved materials

211 BITUMINOUS BINDERS

a) Requirements

Straight run bitumen in addition to the requirements of the Standard Specification the ash content of penetration grade bitumen shall not exceed 5% by weight

b) Types of Bitumen

Prime coat shall be type MC30 unless otherwise stated. Tack coat shall be K1-70 emulsion. For surface dressing the binder shall be 80/100 pen grade bitumen cut back or straight run while binder for asphalt concrete shall be 60/70 pen grade bitumen

228 WORKMANSHIP AND QUALITY CONTROL

The Contractor shall, not later than 4 weeks after the notice to commence the Works, submit a project specific Quality Management System, including the Work Method Statements and Quality Audit for major items of work, showing how all the Contractor's systems will ensure that all the works will conform to the Contract documents. The onus rests with the Contractor to produce work which conforms in quality and accuracy of detail to all the requirements of the Specifications and Drawings, and the Contractor shall, at his/her own expense, institute a quality control system and provide experienced engineers, foremen, surveyors, materials technicians, other technicians and other technical staff, together with all transport, instruments and equipment, to ensure adequate supervision and positive control of the Works at all times. The Contractor shall provide chainmen and labourers as necessary for the Engineer to carry out checks on the Works

The Contractor shall conduct tests or have them conducted continually on a regular basis, to check the properties of natural materials and processed natural materials and of products manufactured on the site, such as concrete and asphalt. The Contractor shall remain fully responsible for any defective material or equipment provided by him. Similarly, the quality of all elements of the Works shall be checked on a regular basis so as to ensure compliance with the specified requirements

The intensity of control and of tests to be conducted by the Contractor in terms of these obligations shall be adequate to ensure that proper control is being exercised.

Where any natural materials or products made from natural materials are supplied, and upon completion of each element of the construction work, the Contractor shall test and check such materials, products and/or elements for compliance with the specified requirements and shall submit his results to the Engineer for approval. Such submission shall include all his measurements and test results and shall furnish adequate proof of compliance with the specified requirements

No specific pay items are provided as compensation for the above obligations, including the provision of all samples delivered to the Engineer, the repair of places from which samples were taken, and the provision of the necessary personnel and testing apparatus and facilities, for which compensation shall be included in the bid rates of the Contractor for the various items of work to which these obligations apply.

The Contractor shall submit to the Engineer for examination, the results of all relevant tests, measurements and levels indicating compliance with the Specifications on completion of every part of the Work

SECTION 3 - SETTING OUT & TOLERANCES

301 SETTING OUT

- a) In addition to the provisions of clause 3.01(a) if the traverse points to be used for the setting out are close to the existing carriageway and interfere with construction works then the Contractor will have to relocate them to a location where they will not be disturbed. The co-ordinates and heights of all traverse points so located shall be listed and provided to the Engineer for checking and/or approval. Contractor shall also monument the new centreline every 200m along straight and all salient points along curves by a pin in the concrete beacon before commencement of any works.

The road reserve boundary posts shall have 12mm diameter steel pins embedded in concrete, 200mm long with 25mm exposed to the air, sticking out from its top surface. This pin shall be co-ordinated and heighted and result of the same shall be provided to the Engineer for approval. Cost of these works shall be included in the rates as no separate item has been provided.

Commencement of the works shall not be permitted until this basic survey data has been provided and approved by the Engineer for at least 5 Kms of the road.

b) Detailed Setting Out

Reference pegs shall be 50mm by 50mm in section 600mm long driven 400mm firmly into ground and painted white above the ground. The offset from centre line shall be indicated by small nail 20mm to 25mm long with its head driven flush with the top of the peg. Chainages, offset and reference elevation shall be clearly indicated to the sides of the peg to the satisfaction of the Engineer.

After cutting of benches and prior to commencement of earthworks or subgrade works, Contractor shall take cross-sections again and submit the copy of the same to Engineer for agreement. These cross-sections shall then be used as basis of measurement for all subsequent layers, unless otherwise stated.

302 TOLERANCES

Add the following:

a) **Pavement Widths**

For Pavement widths for subbase, base and wearing course, the allowable tolerances shall be 0 to +50 mm.

b) **Pipe Culverts**

The maximum deviation from the specified line of a drainage pipe shall be:

Horizontal	25mm in 3.0 m
Vertical	30 mm in 10.0 m

SECTION 4- SITE CLEARANCE AND TOP SOIL STRIPPING

401 SITE CLEARANCE

Site Clearance shall be carried out as directed by the Engineer.

Add the following as the last paragraph in Sub-clause (a):

Site clearance is not required over the gravelled width of existing road and shoulders. No measurement and payment for site clearance will be made for this width. The remaining area within the road reserve including sides of existing embankments and cuttings shall be cleared as instructed by the Engineer. This operation shall also include the removal of all trees, except for some trees as directed by the Engineer. The Contractor shall provide paint and all the assistance the Engineer may require to mark the trees which **should not** be removed during site clearance.

The Contractor shall take care not to uproot or damage trees which are within the road reserve but outside the construction width. After the Contractor has staked out the extent of the road, the Engineer, with the assistance of the Contractor, shall mark out the trees to be removed. After removal, the trunks and branches of these trees shall be cut up into pieces not more than 2.0m in length, transported and neatly stored at the nearest Ministry of Roads camp or otherwise in a position to be indicated by the Engineer. No additional payment shall be made for complying with these requirements and it is deemed the Contractor will have included its cost in the rates for site clearance.

402 REMOVAL OF TOPSOIL

Topsoil shall include up to 200mm depth of any unsuitable material encountered in existing or newly constructed drains, drainage channels, and accesses.

403 REMOVAL OF STRUCTURES, FENCES AND OBSTRUCTIONS

When instructed by the Engineer, the Contractor shall demolish or remove any structure. Measurement for the works shall be done on dayworks basis and payments made under the appropriate item in the Bills of Quantities.

SECTION 5 – EARTHWORKS

501 SCOPE OF SECTION

The scope of this section includes all earthworks associated with the Contract, including roadside amenities, service roads, walkways and any widenings.

504 PREPARATION PRIOR TO FORMING EMBANKMENT

In cuttings, the contractor shall excavate to a level that would accommodate the 300mm subgrade and the existing ground below this **MUST** be processed and compacted in accordance with clause 504 of the standard specifications.

Where benching is required to existing pavement to accommodate new cross section, the rate for compaction of resultant ground shall be deemed to cover this activity

Excavation in the pavement of the existing road shall be kept dry. In the event of water penetrating the underlying layer, construction of the subsequent layers shall be postponed until the underlying layers are dry enough to accommodate the construction plant without deforming or otherwise showing distress. This shall be confirmed through proof-rolling.

Step construction shall be carried out per layer at the joint where excavating both vertically and perpendicular to the direction of the travel. The step shall be 500mm perpendicular to the direction of the travel and 150mm vertical unless otherwise instructed by the Engineer

Special care shall be taken when compacting the new material at the joint ensuring that specified density is achieved

505 CONSTRUCTION OF EMBANKMENTS

Only material approved by the Engineer shall be used in embankments. Soft fill material shall comply with the following requirements:

- Organic matter less than 5% by weight
- CBR of not less than 10% for carriageway and shoulders measured after 4-day soak on a laboratory mix compacted to a dry density of 95% (AASHTO T 99)
- Swell less than 1% on the laboratory mixed sample

Subgrade is defined on the Drawings, and subgrade material shall comply with the requirements of Clause 505 except that the CBR shall have a value of not less than 14% measured after a four (4) day soak on a laboratory mix compacted to a dry density of 95% MDD (AASHTO T180)

Improved subgrade layer is defined on the Drawings and shall comply with the following requirements:

- CBR of not less than 14% measured after 4day soak on a laboratory mix compacted to a dry density of 100% (AASHTO T 99)
- Plasticity Index less than 30%
- Swell less than 1% on the laboratory mix sample.
- Placed in layers not exceeding 150mm thick

Improved subgrade shall mean the upper 450mm of earthworks, either in-situ or in fill and subgrade shall be provided as part of the earthwork operation, and payment shall be made as fill.

No extra payment will be made for haulage of suitable material from borrow pits as the overhaul costs shall be deemed to have been factored in the rates inserted in the Bills of Quantities.

508 COMPACTION OF EARTHWORKS

At pipe culverts, all fill above ground level around the culverts shall be compacted to density of 97% MDD (AASHTO T180) up to the level of the top of the pipes or top of the surround(s), if any and for a width equal to the internal diameter of the pipe on either side of the pipe(s) or surround(s) as applicable.

At locations adjacent to structures (up to 100m away from structure), all fill above ground level up to the underside of the subgrade shall be compacted to density of 95% MDD (AASHTO T180). In case of fill around box culverts this should be carried out for the full width of the fill and for a length bounded by the vertical plane passing through the ends of the wingwalls

Notwithstanding the provision of clause 503 of the standard Specification, Compaction of subgrade material (i.e. material immediately below formation) in cut areas shall not be carried out by the contractor in areas where the formation is formed in hard material, unless specific instructions to the contrary are issued by the Engineer

Where improved sub-grade material shall be required, the material shall have a CBR greater than 14% and this shall be compacted and finished to the same standards and tolerances as those required for normal subgrade and clauses in the specifications applying to normal subgrade shall also apply.

509 MASS-HAUL DIAGRAM

Delete Clause 509 entirely and substitute “No Mass-Haul diagram has been provided with the Documents. The Contractor shall be responsible for locating suitable materials for constructing earthworks along the alignment and elsewhere and shall include in his rates for fill, spoil and for the cost of haulage”.

511 BORROW PITS

The first part of the Standard Specification is amended as follows: -

Fill material which is required in addition to that provided by excavation shall be obtained from borrow pits to be located and provided by the Contractor but to the approval of the Engineer contrary to what has been stated.

515 SIDE DRAINS

Whenever excavation works in side drains constitutes a separate operation from the bulk earthworks, such excavation shall be classified as catchwater drains under Section 8 of the Specifications

517 MEASUREMENT AND PAYMENT

Notwithstanding the provisions of clause 517 of the standard specifications, the rate for compaction of fill in soft material shall allow for the requirements of clause 508 of the special specification and no extra payment shall be made for compaction around pipe culverts (97% MDD AASHTO T180)

Quantities for embankment widening shall be measured using the final compacted volume of fill material over the existing embankment after removal of topsoil. Payment for fill for widening shall be made under Item 5.01 of the Bill of Quantities. No payment shall be made to the Contractor for any additional earthworks resulting from his construction methods, or for working space for his construction plant and equipment, or for complying with the requirements of Clause 504. The Contractor shall include the cost of benching in his rates and prices.

The rate for cut to spoil shall also allow for cutting to spoil in any waterlogged areas.

No separate payment shall be made for overhaul, and the cost of haulage shall be included in the Contractor's rates and prices for earthworks.

The rates in the Bill of Quantities shall also include for earthworks associated with roadside amenities, service roads, walkways and any widenings

SECTION 6 - QUARRIES, BORROW PITS, STOCKPILES AND SPOIL AREAS

601 GENERAL

Notwithstanding any indications to the contrary in the Standard specification the Engineer will not make available to the Contractor any land for quarries, borrow pits, stockpiles and spoil areas, except for those areas in road reserves specifically approved by him

The contractor will be entirely responsible for locating suitable sources of materials complying with the Standard and Special Specifications, and for the procurement, Wining, haulage to the site of these materials and all costs involved therein. Similarly, the contractor will be responsible for the provision and costs involved in providing suitable areas for stockpiling materials and spoil dumps. Should there be suitable sites for spoil dumps or stockpiles within the road reserve forming the site of the works the Contractor may utilize this subject to the approval of the Engineer

No additional payment will be made to the Contractor to cover costs arising from the requirements for this Clause and the Contractor must include these costs in the rates inserted into the Bills of Quantities

SECTION 7 - EXCAVATION AND FILLING FOR STRUCTURES

703 EXCAVATION OF FOUNDATIONS FOR STRUCTURES

Unless otherwise instructed by the Engineer, all excavated surfaces in material other than hard material, on which foundations for structures shall be placed, shall be compacted to 97% MDD (AASHTO T180) immediately before structures are constructed.

Paragraph 4, last line: - Replace "95%" with "97%" and "T99" with "T180"

707 BACKFILLING FOR STRUCTURES

All backfilling material shall be selected backfill complying with the requirements for a natural subbase material given in Clause 1203. Unless otherwise instructed by the Engineer, all backfilling material shall be compacted to a minimum of 97% MDD (AASHTO T180).

Porous filter material shall be clean, uniform, sand or crushed aggregate with a d₅₀ between 0.4mm and 1.2mm and less than 5% particles finer than 75micron sieve. The d₁₀₀ must be lower than 5mm

709 EXCAVATIONS FOR RIVER TRAINING AND NEW WATER COURSES

Payments for river training and establishment of new watercourses shall only be made where such work constitute permanent works. Works done for road deviation or other temporary works shall not qualify for payment.

710 STONE PITCHING

Stone pitching to drains, inlets and outlets of culverts, to embankments and around structure shall consist of sound unweathered rock approved by the Engineer. The stone as dressed shall be roughly cubical in shape with minimum dimensions of 150 x 150mm for normal thickness of stone pitching. Cement mortar Grouting will be done for all stone pitching areas and the top line of the stone pitching should be grouted/sealed with concrete class 15/20. The cement shall be mixed with sand in the ratio of 1:3 by volume to form the grout.

The surface to receive the pitching shall be compacted and trimmed to slope and the stone laid, interlocked and rammed into the material to give an even finished surface. Soil erosion is rampant along the project location and this can be minimized by ensuring that proper protection works is carried out along the drains using stone pitching. Most of the sections shall be stone pitched especially areas where we have steep slopes to minimize undermining of the road by rain water or as may be instructed by the Engineer.

In areas where stone pitching has been damaged, the Contractor shall identify such areas and notify the Engineer for his agreement of the extent of the Works required and his approval and instructions to proceed with the Works. Stone Pitching Repair and reconstruction shall be carried out in accordance with Clause 710 of the Standard Specifications.

711 GABIONS

Where instructed by the Engineer the Contractor will install gabions as protection works to washout areas or bridge Piers and or Abutments. Gabions shall be constructed in accordance with Clause 711 of the Standard Specification

In cases where existing gabions have been damaged, the Contractor shall identify them and notify the Engineer for his agreement of the extent of the Work required and his approval and instructions to proceed with the Works

The Works shall involve removal of the damaged gabions / rocks, excavation to the correct levels and grades as directed by the Engineer, and in accordance with Clause 711 of the Standard Specifications and reconstruction with new gabions and other necessary materials as necessary. The damaged gabions shall be recovered and transported to KeNHA's Regional Director's offices

712 RIP-RAP PROTECTION WORK

Quarry waste or similar approved material shall be used to backfill scoured and eroded side, outfall and cut-off drain. The material shall be compacted to form a flat or curved surface preparatory to stone pitching of drainage channels, existing and new scour checks as directed by the Engineer

The surface to receive the pitching shall be compacted and trimmed to slope and the stone hand laid, interlocked and rammed into the material to give an even finished surface. The interstices of the Pitching shall be rammed with insitu material. The insitu material immediately behind the pitching shall be compacted to minimum density of 95% MDD compaction (AASHTO T180)

714 BACKFILL BELOW STRUCTURES

All backfilling material shall be selected backfill complying with the requirements for a natural subbase material given in Clause 1203. Unless otherwise instructed by the Engineer, all backfilling material shall be compacted to a minimum of 97% MDD (AASHTO T180).

SECTION 8 - CULVERTS AND DRAINAGE WORKS

All concrete works for culverts and other drainage structures shall be done in accordance with Section 17 of the specifications

801 SCOPE OF SECTION

Amend as follows:

The operations specified in this section apply to the installation of drainage works and reinstatement and improvement of the same.

In addition, this Section covers: -

- Installation of 600 mm, 900 mm or 1200 mm diameter pipe culverts using the balloon casting technology or precast pipes rings.
- Desilting and cleaning of existing pipes and outfall drains to make them free flowing.

804 EXCAVATION FOR CULVERTS AND DRAINAGE WORKS

The Standard Specifications are amended as follows:

- (a) In paragraph 6, line 3, and in paragraph 7, line 5 and in paragraph 11, line 6, "95% MDD (AASHTO T99)" and insert "97% MDD (AASHTO T180)".

- (b) Removal of Existing Pipe Culverts

Where instructed by the Engineer, the Contractor shall excavate and remove existing culvert pipes and the void left after removal of culvert pipes shall be widened as necessary to accommodate new concrete bedding, pipe and haunching.

The void left by removal of pipes and end-structures shall be carefully preserved in order to accommodate replacement with 600 mm, 900 mm or 1200 mm diameter pipe culverts as directed by the Engineer.

Regarding backfill, reference is made to Clause 812.

- (c) Excavation for Culverts and Drainage Works

The Contractor shall carry out all excavations for new culverts and drainage works to the lines, levels, inclinations, and dimensions shown on the Drawings or as instructed by the Engineer.

805 EXCAVATION IN HARD MATERIAL

In the Standard Specifications, Sub-clauses 805(a) and 805 (b) delete "'95% MDD (AASHTO T99)" and insert "97% MDD (AASHTO T180)".

In sub-clause 809(a), paragraph 1, line 1, substitute "95% MDD (AASHTO T99)" with "97% MDD (AASHTO T180)".

In sub-clause 809(c), paragraph 2, line 4, between the words "compacted" and "and shaped" insert the words "to "97% MDD (AASHTO T180)".

Hard material is material, which can be excavated only after blasting with explosives, or barring and wedging or the use of a mechanical breaker fitted with a rock point in good condition and operated correctly. Boulders of more than 0.2m³ occurring in soft material shall be classified as hard material.

809 BEDDING AND LAYING OF PIPE CULVERTS

In sub-clause 809(a), paragraph 1, line 1, substitute "95%" with "100%".

Amend sub-clause 809(b), paragraph 1 as follows:

Where pipes are laid on a concrete bed the pipes shall be bedded on class 15/20 concrete at least 50mm thick, and extending the full width and length of the pipe barrel.

In sub-clause 809(c), paragraph 2, line 4, between the words "compacted" and "and shaped" insert the words "to 97% MDD (AASHTO T180)".

Add the following Sub-Clause 809(d):

Bedding, Laying and Surround for Concrete Pipe Culverts Cast In-Situ

In addition to the requirements of the Standard Specification, where the inflatable balloon method of casting culverts in-situ is used, thorough pre-construction trials shall be carried out and the necessary adjustments made to ensure that: -

- (i) Line and grade of the culverts is achievable
- (ii) The balloons and the pressure gauge/machine are in good working conditions
- (iii) The inner concrete barrel surface immediately in contact with the inflated balloon form shall achieve class F3 finish.

Besides this the following amendments shall be made; -

- (a) Where inflatable balloons are used, the surround shall be 200mm.
- (b) Concrete surround shall be "class 20/20".
- (c) BRC A193 mesh will be provided within the surround and bed as provided for in the drawings or as instructed by the engineer

The Contractor may propose an alternative method of casting culverts in-situ, which shall be subject to the approval of the Engineer. Culverts shall be constructed to conform with dimensions shown on the drawings.

Measurement and payment for culverts cast in-situ by use of balloon method or any other approved method shall be made per linear meter under the existing bill items. The rates inserted shall allow for compaction of the bottom of excavation to 100% MDD (AASHTO T.99) and the BRC mesh used.

810 JOINTING CONCRETE PIPES

Add as follows:

The concrete pipes for the culverts shall have ogee joints and will be jointed by 1:2 cement: sand mortar and provided with fillets on the outside as described in clause 810 of the Standard Specification.

811 CONCRETE BEDS, SURROUNDS AND HAUNCHES

Amend the Standard Specification line 1 of the second paragraph, to read as follows:-

All concrete for beds shall be of class 15/20 whilst concrete for surrounds and haunches shall be of class 20/20 for cross drain culverts, complying with Section 17 of this Specification formed to the dimensions shown on the drawings or as instructed by the Engineer.

812 BACKFILLING

In the Standard Specifications, clause 812

Delete paragraph 6 “for pipe culverts depth of 150mm”, entirely.

Wherever the expression "dry density of 95% MDD (AASHTO T. 99)" occurs delete and replace with "dry density of 97% MDD (AASHTO T180)".

The rates entered for laying of pipe culverts shall allow for backfilling to pipe culverts and compacting to 97% MDD (AASHTO T180) and these works shall **not** be measured and paid for separately.

812.1 Filter fabric for backfilling behind structures, drains and revetment works

Where filter fabric is specified, it shall be durable non-woven geotextiles or synthetic fibres, unaffected by soil acidity, soil alkalinity and bacteria. The fabric shall be made by an approved, reputable manufacturer and shall have a mass and strength at least equal to the following criteria:

	Mass g/m ²	Wide Tensile kN/m ²	Strip Strength	Mullen Burst Strength kPa
Under and For Drainage Material	180	Mean 12/12		2160
Behind bridges, Box culverts, Under Gabions, Gabion Mattresses or Grouted Rip – Rap	250	Mean 18/18		3040
Under Rip-Rap and Rockfill	300	Mean 21/21		4200

The mesh size of the fabric shall be sufficient to effectively retain the material on which it is placed but shall not be greater than 150 microns.

The fabric shall be installed in accordance with the manufacturer’s instructions. The fabric shall be placed on levelled ground, with sharp rocks and other objects which are likely to damage the fabric being removed and all pits and depressions being backfilled and compacted.

The fabric shall be overlapped by a minimum of 300 mm and stitched at joints in such a manner that the strength of the joints is at least 50 per cent of the strength of the fabric.

Rip-rap or gabions or other materials, as applicable, shall be placed carefully on the filter fabric in such a way as to avoid damage to the fabric. In any event construction procedures shall ensure no damage to the filter fabric or impairment of its design function. Should the filter fabric be damaged, it shall be replaced, including removal of the overlay material, in a manner approved by the Engineer.

No mechanical plant shall traffic over filter fabric unless a minimum thickness of 200 mm of fill material has been placed over the fabric.

813 PRECAST CONCRETE OPEN CHANNELS

Add the following to the standard specification clause 813: -

813.1 Half Round Open Channels

These shall be provided as directed by the Engineer and in compliance with sections 813 and 820 of the standard specifications.

813.2 Invert Block Open Channels

These shall be provided as directed by the Engineer and in compliance with sections 813 and 820 of the standard specifications.

Where directed by the Engineer, the Contractor shall excavate in any material provide and place concrete for the bedding, backfill and remove surplus material to spoil, provide, lay and joint precast concrete invert blocks, side slabs, slotted drains and gulley chambers.

Precast concrete invert block side drains and gulley chambers shall comply with the requirements of BS 340, and shall be laid in accordance with the drawings.

Precast concrete invert block drains and side slabs shall be formed of concrete of the class specified and to the dimensions shown on the drawing. Drains shall not normally be laid to a radius of a curvature less than 10 times the bed width or a diameter of the drain.

Invert block drains shall be constructed in the positions and to the levels and dimensions shown on the drawings or as directed by the Engineer. The earth sides to such channels shall be neatly finished to a slope of 1: 1 or such other slope as the Engineer may direct. Invert block drains and side slabs shall be laid on 100 mm thick compacted approved gravel material and neatly jointed with mortar consisting of 1:3 cement: sand by volume.

813.3 Invert Block drain

Where instructed, the Contractor shall excavate, compact the excavated bed to 97% MDD AASHTO (T180), backfill as necessary with selected material compacted to 97% MDD AASHTO (T180) lay and joint invert block drains of 300mm diameter with two side slabs.

814 SUBSOIL DRAINS

Add the following:

In the event of excavation for repairs exposing local seepage, springs or high water table, the Engineer may instruct the provision of counter fort or French drains.

These drains shall consist of a trench excavated to the alignment, width, depth and gradient instructed by the Engineer and backfilled with approved compacted clean hard crushed rock as specified in Clause 814 of the Standard Specification. Where these drains lie within the carriageway, the carriageway shall be reinstated with compacted graded crushed stone or stabilized gravel and surfaced with hot asphalt or a surface dressing as instructed by the Engineer.

Payment will be made in accordance with Clause 820 of the Standard Specification.

814.1 Filter Fabric to Sub-Soil Drains

A filter fabric shall be placed under, around and over rock fill of the sub-soil drains. The provisions and placing of the fabric shall be in accordance with Clause 814 of the Standard Specification and Clause 822 of the Special Specification. Payment shall be in square metre of the fabric used.

817 MITRE DRAINS, CUT-OFF DRAINS, CATCHWATER DRAINS, SIDE DRAINS, CULVERT OUTFALL DRAINS AND EARTH DAMS

Add the following Sub-Clauses:

817.1 Cleaning Existing Drains

In areas of existing side drains, mitre or outfall drains where such are blocked, the Engineer shall instruct the Contractor to clean and clear the drains to free flowing condition.

The work shall consist of:

- (a) Stripping and removal of any extraneous material to spoil including vegetation and roots in the drains to the satisfaction of the engineer.
- (b) Spreading of any spoil to the satisfaction of the Engineer.
- (c) Shaping the drains to free flowing condition as directed by the Engineer.

No extra payment will be made for cleaning of existing chains, and the costs shall be included in other Bill items.

817.2 Channels

The Engineer may instruct that the Contractor provides open channels in place of existing sub drains where the latter may be damaged or in any other place. The rates entered by the Contractor in the Bill of Quantities must include for removal and disposal of any sub drain material, excavation to line and level, backfilling and compaction as directed by the Engineer.

The channels shall be constructed of precast class 20/20 concrete of minimum 80 mm thickness and lengths or widths not exceeding 1000 mm. Joints shall be at least 15 mm wide filled with 1:2 cement sand mortar.

817.3 Spoil Material

The Contractor shall be responsible for removal from site of all materials excavated in the course of undertaking works in this section of the specifications, unless suitable for re-use, and deposit of the material in a spoil dump to be approved by the Engineer.

819 CLEANING AND MAINTENANCE

Add the following:

819.1 Desilting of Pipe Culverts

Where instructed, the Contractor shall desilt the existing pipe culverts by removing all the material from the pipe to make them clean and free flowing.

No separate payment will be made for such work and provision should be included in the rates.

820 MEASUREMENT AND PAYMENT

Add Sub-Clause 823(r): -

Item : Concrete for balloon cast pipes/culverts
cast in-situ

Unit : m³

The rate for concrete for each size of culvert instructed shall include for the surround and for the bedding as instructed including the A193 BRC mesh and shuttering, calculated from the dimensions given in the drawings or as directed by the Engineer.

The rate shall also include for the cost of providing and placing the concrete and complying with the requirements of Clauses 809, 810, 814, 819 and 1713 of the Standard Specification.

No extra payment shall be made for provision of inflatable forms/balloons and other requirements for casting culverts in-situ and the Contractor shall be deemed to have provided for these in his rates and prices.

Add Sub-Clause 823(s): -

Item : Invert Block Drain

Unit : m

The payment for the invert block drain shall include the cost of the bottom drain and two side slabs and shall be measured in a linear metre.

Add Sub-Clause 823(t): -

Item : Geotextile

Unit : m²

The payment for the geotextile shall be in square metres and shall include the cost of providing and placing as per the specifications or as instructed by the engineer

SECTION 9 - PASSAGE OF TRAFFIC

901 TRAFFIC CONTROL AND DEVIATIONS

a) Programme for the Control of Traffic

Following the award of the contract, the Contractor shall submit to the Engineer a detailed Traffic Control Plan. Such plan shall be approved by the Engineer, and where necessary, by the appropriate statutory authority, before the Contractor commences work. The plan shall but is not limited to, the method of protection of the public and give details of the duration and hours of operation, location, type and numbers of traffic safety devices, barricades, warning signs, flag men equipped with two way radios and the like. The Traffic Control Plan shall be in accordance with and complimentary to the Programme of Works submitted under Clause 104

During the preparation of this Traffic Control Plan, the Contractor shall take into consideration the following;

- i) The Contractor shall conduct his operations in such a manner that no greater length or amount of work is undertaken than he can efficiently carry out having due regard to the rights and conveniences of the public and the requirements of this Section.
- ii) If the Contractor proposes a road closure, he shall provide an alternative routing of the traffic, which must be approved by the Engineer.
- iii) No revisions shall be made to the Traffic Control Plan without the prior written approval of the Engineer and the Contractor shall allow fourteen (14) days for the Engineer to review any request for revision of the Traffic Control Plan.
- iv) The Traffic Control Plan shall conform in all respects with the requirements of this Specification.

b) Penalty to comply with the requirements of Section 9

The failure or refusal to comply on part of the Contractor and or maintain the deviation, improve and maintain the existing road ahead of the works at the proper time, or to take the necessary actions for the safety and convenience of the public traffic as required by the statutory authorities, or as instructed by the Engineer, shall be sufficient cause for the Employer to apply a deduction of Kshs. One Hundred and Fifty Thousand (150,000) per day from any monies due to the Contractor, until all provisions prescribed have been complied with to the satisfaction of the Engineer.

c) Contractor's inspection of the site

The Contractor should allow for the costs of complying with the requirements of this clause in his rates. The Contractor will be deemed to have inspected the site and satisfied himself to the adequacy of his bid for these works and no additional payments will be made to the Contractor for any expenditure on traffic control or the provision of deviations. The Employer shall not be liable for inadequate prior investigations of this nature by the Contractor.

d) Standard of Construction works

The standard of all works carried out under this Section shall comply with the requirements of the appropriate sections of these Specifications

903 MAINTENANCE OF EXISTING ROAD

The Employer shall hand-over the existing road to the contractor at the commencement of the Contract. The Contractor shall be responsible for all repairs and maintenance during the duration of the Contract. Where the existing road is gravel, the Contractor shall maintain it with suitable approved gravel of properties detailed in 904 (c) below.

Where the existing road is paved, the contractor shall maintain it by repairing the potholes and edge breaks asphalt concrete. The work shall include, but not limited to, excavating and trimming around the pothole or edge break and removing deleterious material

The Contractor shall regularly inspect the road and carry out such repairs and maintenance to the satisfaction of the Engineer. If at any time, the Engineer draws the Contractor's attention to a road section

which requires maintenance, the contractor shall promptly repair the section. The contractor shall be legally responsible for any accident or damage attributable to his failure to maintain the road.

904 CONSTRUCTION OF DEVIATIONS

a) General

In addition to requirement of this clause, the maximum length of deviation road shall be restricted to 2Kms at any given time unless otherwise instructed. The Contractor shall construct and complete deviations to the satisfaction of the Engineer before commencing any permanent work on the existing road. Also during these works the contractor is supposed to provide a detour of adequate pipe culverts for pedestrian and traffic crossing where there is bridge works.

Contractor will be allowed to open further 2Km of the deviation road only when 80% of the permanent work has been completed on first one and he will not be allowed to open further 2Km till he has completed first 4Km of the road and has it opened to traffic

Where the old road exists near the main road, the Contractor shall use this road as deviation road.

b) Geometry

The carriageway width of the deviations shall not be less than 6.5m wide and suitable for 2-way lorry traffic unless otherwise specified.

c) Construction

Unless otherwise instructed gravel wearing course for the deviation shall be 150mm compacted thickness. The materials shall have a minimum CBR of 20% at "97% MDD (AASHTO T180)", Plasticity Index of less than 15% and grading class 1 as per Section 10 of the Standard Specification. The Contractor shall allow in his rate for removal of any unsuitable material before placing of gravel wearing course, as this will not be paid for separately.

In addition to provision of this clause, Contractor is required to sprinkle water at least 4 times a day at the rate of 1 - 1.4 litres/m² in regular interval to minimize the effects of dust. Latest sprinkling time shall be one hour before the sunset.

906 PASSAGE OF TRAFFIC THROUGH THE WORKS

The Contractor shall arrange for passage of traffic through the works during construction whenever it is not practicable to make deviations. The contractor shall be reimbursed in accordance with the standard specifications.

Any damage caused by passing traffic through the works shall be made good at the contractor's own cost.

907 SIGNS, BARRIERS AND LIGHTS

The Contractor shall provide signs, barriers and lights as shown in the drawings at the locations where the traffic is being carried off the existing road to the deviation and back again to existing road.

The Contractor shall provide ramps and carry out any other measures as instructed by the Engineer to safely carry traffic from the road to deviation.

Contrary to what has been specified in this clause the road signs provided shall be fully reflectorized and in conformity with clause 9.1 of the "Manual for Traffic Signs in Kenya Part II".

909 ASSISTANCE TO PUBLIC

In addition to provision of clause 909, the Contractor shall maintain close liaison with the relevant authorities to clear any broken down or accident vehicles from the deviations and the main road, in order to maintain smooth and safe flow of the traffic.

912 MEASUREMENT AND PAYMENT

(a) Passage of traffic through the works

Payment shall be made on Lump Sum basis.

(b) Maintenance of existing road

The Contractor will be paid by the cubic metre of compacted gravel used to maintain existing road.

(c) Construct Deviation

(i) Road Deviation

The Contractor shall be paid only 50% of the rate for this when he completes deviation road to the satisfaction of the Engineer. The balance shall be paid in equal monthly installments over the contract period, as he satisfactorily maintains the deviation (as per clause 904 and 905 above) when it is in operation.

(ii) Deviation using Pipe Culverts

The Contractor shall be paid only 50% of the rate for this when he completes deviation to the satisfaction of the Engineer. The balance shall be paid in equal monthly installments over the contract period, as he satisfactorily maintains the deviation when it is in operation. The Contractor shall be paid full amount when the bridge under construction will be in use.

(d) Assistance to Public

The Contractor will be deemed to have included cost of this item in other items and no separate payment shall be made.

SECTION 11 – SHOUDERS

1101 GENERAL

2.0m wide shoulders whose construction approach is detailed in the drawings shall be constructed in accordance with sections 5, 12, 15 and 16 of the specifications as appropriate

SECTION 12 - NATURAL MATERIAL SUBBASE AND BASE

1203 MATERIAL REQUIREMENTS

Natural materials for base and subbase shall conform to the specifications given in Section 12 of the Standard Specifications for cement or lime improved base and subbase.

1209 MEASUREMENT AND PAYMENT

Natural material for subbase and base shall be measured by the cubic metre placed and compacted upon the road calculated as the product of the compacted sectional area laid and the length.

The method of measurement shall be “method - A” as in the standard specifications.

No extra payment will be made for haulage of gravel material as the overhaul costs shall be deemed to have been factored in the rates inserted in the Bills of Quantities

SECTION 13 - CEMENT TREATED GRADED CRUSHED STONE (GCS) FOR BASE-COURSE

Treatment of GCS shall be carried out in accordance with Section 14 of the specifications with the following additional guidelines

1303 MATERIAL REQUIREMENTS

a) Graded Crushed Stone

Properties

Graded Crushed Stone shall comply in all respects comply with Section13 of the Standard Specifications and shall be stone Class B in accordance with Clause 1303(b)

Grading

The Maximum Aggregate Size of the material shall be 0/30mm in accordance with Clause 1303(c)

b) Cement

Cement for treatment shall be CEM II, 42.5N Portland Cement manufactured to KS EAS 18-1: 2001 - Part 1, KS 1725: 2001 standards. The cement content of the treated material shall be 2% by weight of the GCS

c) Mixing

The material to be treated and the cement shall be mixed in an approved batching plant

d) Laying and compaction

Laying

Treated GCS shall be placed by using a self-propelled spreader finisher fitted with an electronic level control device, and level control shall be from a tensioned wire supported at every 5m intervals. The graded crushed stone shall be finished to the tolerances given for base in Section 3 of these Specifications

Compaction

The moisture content of the treated material shall be as directed by the Engineer but nevertheless within the range of 90% to 100% of the Optimum Moisture Content (Vibrating Hammer Method). Minimum compaction shall be 97% MDD (Vibrating Hammer Method)

1309 PROTECTION AND CURING

Protection and curing shall be carried out in accordance with the provisions of Clause 1409 (i) of the Standard Specification. The treated GCS layer shall be kept continuously damp by spraying with water for seven days after laying to be followed by application of MC70 prime coat

1310 MEASUREMENT AND PAYMENT

Stabilizer

The provision of the stabilizer shall be measured by the tonne calculated as the specific weight of stabilizer added to the material

SECTION 14 - CEMENT TREATED MATERIALS

1401 CEMENT TREATMENT

1401.1 Cement

Cement for improvement shall be CEM II, 42.5N Portland Cement manufactured to KS EAS 18-1: 2001 - Part 1, KS 1725: 2001 standards. The cement content for the treated material shall be between 2-3% of the total weight of gravel to be improved. In adopting the cement content for improvement care shall be taken to ensure that base quality improved gravel for sub-base is avoided. The Engineer shall exercise his discretion to any variation in the rate of application of the cement, which he may see fit to order from time to time

1401.2 Lime treatment

Lime treatment will be as outlined in the Standard Specifications for road and bridge construction. The lime content of the stabilized material shall be as indicated by the Engineer.

1401.3 Moisture content and Compaction

The moisture content of the treated material shall be as directed by the Engineer but nevertheless within the range of 95% to 105% of the Optimum Moisture Content (AASHTO T180). Minimum compaction shall be 97% MDD (AASHTO T180")

1401.4 Mixing

The material to be treated and the cement shall be mixed in an approved batching plant

1401.5 Laying and compaction

Laying

Treated gravel shall be placed by using a self-propelled spreader finisher fitted with an electronic level control device, and level control shall be from a tensioned wire supported at every 5m intervals. The graded crushed stone shall be finished to the tolerances given for base in Section 3 of these Specifications

Compaction

The moisture content of the treated material shall be as directed by the Engineer but nevertheless within the range of 95% to 105% of the Optimum Moisture Content (AASHTO T 180). Minimum compaction shall be 95% MDD (AASHTO T 180)

1409 PROTECTION AND CURING

Protection and curing shall be carried out in accordance with the provisions of Clause 1409 (i) of the Standard Specification. The treated sub-base layer shall be kept continuously damp by spraying with water for seven days after laying to be followed by laying of GCS base-Course

1412 MEASUREMENT AND PAYMENT

Stabilizer

The provision of the stabilizer shall be measured by the tonne calculated as the specific weight of stabilizer added to the material

Mix-in stabilizer

Mixing stabilizer into the material shall be measured by the cubic metre of treated material calculated as the product of the compacted sectional area treated and the length.

SECTION 15 - BITUMINOUS SURFACE TREATMENTS

PART A - GENERAL

1501A GENERAL

Quality control, workmanship and equipment shall be to current international best practice. Bituminous surface treatments shall be carefully designed by the Contractor, taking into account traffic volumes, ALD of the chippings, surface conditions and requirements for specific locations. Application rates of the bitumen spray and the chippings will be approved by the Engineer prior to any trial sections of the work, but the under listed is anticipated and can be used for guidance purpose i.e;

a) Chippings

10/14mm size pre-coated chippings at a spread rate of 80-100 square meters per cubic meter as single seal.

b) Bitumen Spray Rates

0.8 - 1.2 l/m² of 80/100 penetration grade bitumen (cut back or straight run) for the single seal

PART B - PRIME COAT AND TACK COAT

1502B MATERIALS FOR PRIME COAT AND TACK COAT.

For prime coat, the binder shall be a medium-curing cutback MC30 unless otherwise directed by the Engineer

The rate of spray of bituminous prime coat refers to the gross volume of the cutback bitumen, that is to say the volume of the bitumen plus dilutants

The rates of spray of the prime coat shall be as instructed by the Engineer and shall generally be within the range 1.0-1.2 litres/square metre

Prime coat shall be applied to all gravel surfaces that are to receive asphalt concrete

The tack coat shall consist of bitumen emulsion K1-60 unless otherwise directed by the Engineer.

The rates of spray of the tack coat shall be as instructed by the Engineer and shall generally be within the range 0.5 - 0.8 litres/square metre

PART C – SURFACE DRESSING

1502C MATERIALS FOR SURFACE DRESSING

Binder

The bituminous binder shall be 60/70 penetration grade bitumen (cut-back with kerosene fuel in accordance with prevailing road temperatures or straight run), and conforming to Clause 211 of the Standard Specification

The Contractor jointly with the Engineer shall carry out a minimum of five (5) bitumen affinity tests on each single size aggregate stockpiles to be used into the works and if any result is less than 95% coverage, then the binder shall be blended with **ColAmin** or similar approved adhesive additive as per manufacturer's instructions at 0.2 - 0.5% by mass of binder. The Contractor shall propose optimum dosage of the adhesive additive by carrying out bitumen affinity tests on the crushed aggregates for approval by the Engineer

Chippings

Chippings shall be of class 2 material and shall comply in all respects with Clause 1502C of the Standard Specification. The contractor's attention is drawn to the requirements of Clause 1502C and 1504C of the Standard Specification with regard to cleanliness and dust content of chippings for surface dressing. Should it prove necessary in the Engineer's opinion to wash chippings, no extra payment will be made to the contractor for this operation

1503C SPRAY AND SPREAD RATES OF BITUMEN AND CHIPPINGS

Spray and Spread Rates for bitumen and chippings cannot be calculated until samples of the chippings to be used are available for test

After submission of samples and completion of laboratory tests on chippings and binder, the Contractor shall in the presence of the Engineer and the Chief Materials Engineer or representatives, lay trial sections of seal at various rates of spray and spread as directed by the Engineer and in accordance with clause 1503C of the Standard Specification.

Should any change occur in nature of source of chippings or bitumen, the Contractor shall advise the Engineer accordingly who will then decide if any revisions are required to the spray and spread rates

If any changes are required, the Contractor shall carry out further trials as instructed by the Engineer

Payment for binder and chippings will be based on the instructed spray and spread rates used which may not necessarily be those specified. The Engineer will specify the spray rates of bitumen as residual bitumen per square meter. Actual spray rates used by the Contractor must be adjusted to compensate for any cutter added

1505C PRECOATED CHIPPINGS

Chippings utilized for surface dressing works under this contract shall be pre-coated in accordance with clause 1505C of the Standard Specification. The binder used for pre-coating chippings shall be MC30 cut-back bitumen

The amount of bituminous binder used to pre-coat chippings will be as instructed by the Engineer and will normally be between 0.4% and 1.0% residual bitumen as percentage of the total dry weight.

Prior to laying any pre-coated chippings the Contractor shall prepare trial mixes of bitumen and chippings in the presence of the Engineer. After completion of trial mixes the Engineer shall issue written instructions to the Contractor indicating the amount of binder to be added in pre-coated chippings. The Contractor shall maintain this proportion unless the surface or nature of the chippings changes when the Contractor shall repeat the trials and the Engineer will issue revised instruction.

No separate payments shall be made for the pre-coating exercise. The contractor shall have included in his rates the cost of complying with this clause

1511C MEASUREMENT AND PAYMENT

(a) Seal coat

Seal coats shall be measured by the litre, for each type of bituminous binder for each seal coat, calculated as the product of the area in square metres sprayed and the rate of application in litres/square metres instructed, corrected to 15.6 °C

(b) Chippings

Chippings shall be measured by the cubic metre of each nominal size for each class calculated as the product of the area in square metres covered and the reciprocal of the instructed rate of application in square metres/cubic metre or the actual rate of application in square metres/cubic metre whichever calculation gives the lower volume

SECTION 16 - BITUMINOUS MIX BASES, BINDER COURSES AND WEARING COURSES

All Bituminous mixes works shall be done in accordance with the standard specifications.

PART A – GENERAL

1603A CONSTRUCTION PLANT

a) Compaction plant

To achieve specified densities it is expected that vibrating rollers will be required. To achieve satisfactory results it is essential that thorough preconstruction trials be carried out to ensure that the vibrating rollers are set up at the optimum amplitude and frequency for the material being laid, that they do not break down aggregate particles and that the optimum compaction temperatures are established to allow compaction without creating ripple effects or other distortions of the surfacing.

1605A DESIGN AND WORKING MIXES

Delete the second paragraph and insert the following:

At least two months, prior to laying asphalt concrete, the contractor jointly with the Engineer shall carry out design mixes STRICTLY complying with SUPERPAVE requirements (clause 1602B, 1603B & 1604B) using approved constituent materials.

The design process shall be phased as follows:

Phase1: Testing of constituent materials to confirm compliance

Phase 2: Laboratory mix designs complying with all the specifications

Phase3: Plant mixing to confirm compliance with laboratory parameters

Phase 4: Site trials

Should any changes occur in the nature or source of the constituent materials, the Contractor shall advice the Engineer and a new mix design shall be established using the procedure set above

1606A SITE TRIALS

Delete the second paragraph and insert the following:

“ The trials shall be carried out to: -

- a) Test materials designed in the laboratory so that a workable mix, which satisfies the specification requirements, can be selected.
- b) To enable the Contractor to demonstrate the suitability of his mixing and compaction equipment to provide and compact the material to the specified density and to confirm that the other specified requirements of the completed asphalt pavement layer can be achieved.”

Renumber paragraph 5 from “(v) –(vi)” to read “(v)-(viii)”

1607A MIXING OF AGGREGATES AND BITUMEN

Delete the second and third paragraphs, then add the following:

The aggregates, minus the filler, prepared as specified above, shall be accurately weighed and conveyed into the mixer in proportionate amounts of each aggregate size required to meet the Job-Mix Formula. The required amount of bitumen for each batch shall be introduced into the mixer. In batch mixing, the bitumen shall be added after the aggregates have been introduced into the mixer

and mixed for 5 to 10 seconds. The filler shall be added after the bitumen and mixing shall continue after addition of the filler for at least the time recommended by the plant manufacturer, or as much extra time as is necessary to obtain a homogeneous mixture, but for no longer.

Aggregate and bitumen shall each be heated to enter the mixing chamber at temperatures selected within the range 150 to 170°C. The temperature of the stone at entry to the mixing chamber shall not be more than 15°C higher than that of the bitumen; the temperature of the bitumen shall be such that on entry to the mixer its kinematic viscosity is in the range 150 – 300 centistokes. The temperature of the aggregate and bitumen at entry into the mixing chamber shall be chosen within the above limits and having regard to the prevailing air temperature and haulage distance to ensure that the temperature of the mix is between 135°C and 165°C when it is laid and not less than 120°C when rolling is commenced. If excessive displacement occurs under the roller the minimum rolling temperature may be reduced at the sole discretion of the Engineer.

The volume of the aggregate and bitumen shall not be so great as to extend above the tips of the mixer blades when the blades are in vertical position. All overheated and carbonised mixtures, which foam or show indication of moisture, will be rejected. When moisture is detected in the finished mixture, all aggregates in the bins shall be removed and returned to the stockpiles.

1608A TRANSPORTING THE MIXTURE

Delete entire clause and insert the following:

The mix shall be transported from the mixing plant to the spreader in trucks having tight, clean, smooth beds, which have been treated to prevent adhesion of the mixture to the truck bodies. Gasoline, kerosene, diesel fuel or other solvents shall not be used for this purpose. Loads shall be covered by waterproof canvas or metal sheets during wet weather. Vehicles shall be insulated when the air temperature and/or length of haul make this necessary to maintain the temperature between the specified limits. Any loads wetted excessively by rain will be rejected. Hauling over freshly laid material will not be permitted.

1609A LAYING THE MIXTURE

Add the following

Mixtures that have a temperature of less than 135°C when dumped into the spreader, will be rejected. The spreader shall be adjusted and the speed regulated so that the surface of the course will be smooth and the course of such depth that, when compacted, it will conform to the cross-section shown on the Drawings. Lanes shall be parallel to the road centreline.

Add the following:

All joints shall present the same texture, density and smoothness as other areas of the surfacing. The joints between old and new lanes or sections shall be carefully formed in such manner as to ensure a continuous bond between the old and new pavement. All contact surfaces at cold joints, joints with manholes, pits, etc. shall be coated with a thin, uniform coat of MC70 or other medium curing bitumen.

1610A COMPACTION

Add the following:

Tests for conformity with the smoothness and levels specified shall be made by the Contractor immediately after initial compaction and any deviations in excess of the specified tolerances shall be corrected by loosening the hot surface with rakes and removing or adding material as necessary before continuing the rolling. The speed of the rollers shall not exceed 5 km/h and shall at all times

be slow enough to avoid displacement of the hot mixture. Any displacement of the mixture occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once by loosening the surface with rakes and re-rolling. Rolling of the surfacing shall be continued until all roller marks are eliminated and the required density is obtained.

The rollers shall not be permitted to stand on surfacing which has not been fully compacted. Precautions shall be taken to prevent the dropping of oil, grease, gasoline, or other foreign matter on any layer. The Contractor shall provide competent workmen who are capable of performing all work incidental to the correction of all surfacing irregularities.

After final rolling, no vehicular traffic of any kind shall be permitted for at least 24 hours.

1611A FINISHING, JOINTS AND EDGES

Add the following:

Construction joints in the various pavement layers shall be staggered by at least the following distances:

(a) Joints in binder course relative to joints in wearing course: 500mm

(b) Joints in DBM base relative to joints in wearing course: 400mm

The Contractor shall produce a plan showing the position of all pavement construction joints for approval by the Engineer before pavement construction commences.

Transverse joints in DBM base, binder and wearing course shall be staggered by at least 500mm. The roller shall pass over the unprotected end of the freshly laid mixture only when laying of the surfacing is to be discontinued for such length of time as to permit the mixture to become cold. Otherwise 500mm at the end of the lane shall be left uncompacted.

Cold transverse joints shall be cut back to expose an even, vertical surface for the full compacted thickness of the course and painted with medium curing cutback bitumen as specified above. The fresh mixture shall be raked uniformly against the joint, and carefully compacted to ensure a good bond with the cold material.

The Contractor shall adjust any kerbs, gulley pots and chambers in accordance with final finished road level before laying the final wearing course.

1614A TOLERANCES

Add the following at the end of the second paragraph:

Passing sieves between 1.0 mm and 0.075 mm sieves	☐ 3% (by total weight of dry aggregate including mineral filler)
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Passing 0.075 mm sieve	☐ 2% (by total weight of dry aggregate including mineral filler)
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1615A ROAD REINFORCEMENT GRID

Where shown on the drawings or where directed by the Engineer, asphalt reinforcement in form of geotextile shall be used to reduce reflective cracking and/or to act as water barrier.

Paving geotextile reinforcement composite shall consist of 'ARMAPAL' reinforcement geosynthetic or similar approved. It shall meet the following physical requirements.

Property	Units	Requirements	Test method
Tensile strength	KN/m	50	SABS 02210 - 88
Elongation at break	%	<7	SABS 02210 - 88
Melting point	°c	260	ASTM D276
Bitumen Retention	l/m ²	1.2	

Where the use of reinforcing for asphalt has been specified, the Contractor shall, at least three months before the material is to be used, submit samples of the type he/she intends to use, together with complete specifications of the material, load-strain relationship of the material, as well as the manufacturer's instructions for use, to the Engineer for approval. Where the material does not carry the mark of an acknowledged standards authority, the Engineer may instruct the Contractor to have the material tested by an approved laboratory and to submit the results.

1616A MEASUREMENT AND PAYMENT FOR ROAD REINFORCEMENT

Item: Geogrid reinforcement netting

Unit: square metres (m²)

The rate shall include for supplying, cutting, place in accordance with the manufacturer's specification, a geotextile reinforcement on the existing surfacing or new surface before laying the dense bitumen macadam or other overlay material. The rate shall include for tacking the material, with tack coat if required and any clout nails.

PART B - ASPHALT CONCRETE FOR SURFACING

1601B DEFINITION

The Asphalt concrete shall be SUPERPAVE (SUPERior PERforming Asphalt PAVement). Modifications to the Standard Specification have been made below to correspond with SHRP SUPERPAVE system recommendations on the design of Hot Mix Asphalt (HMA). The design of hot mixes shall be in accordance with the procedure detailed in Overseas Road Note 19- "A guide to the design of hot mix asphalt in tropical and subtropical countries" and MS2 – "Asphalt Mix Design Methods, 7th Edition by Asphalt Institute". The Contractor shall provide copies of ORN 19 and MS2 to the Engineer at the start of the Project. The salient features with reference to Standard Specification are summarized below

1602B MATERIALS FOR ASPHALT CONCRETE

a) Penetration Grade Bitumen

Delete Sub-Section (a) and replace with:

The bitumen shall be penetration grade, and shall meet the requirements of Table 4.3 in ORN 19 as summarized below

TEST		Test Method (ASTM)	Pen 40/50	Pen 60/70	Pen 80/100
Based on original bitumen penetration					
at 25 ⁰ C		D5	40-50	60-70	80-100
Softening point (°C)		D36	49-59	46-56	42-51
Flash point (°C)	Min	D92	232	232	219
Solubility in trichloroethylene (%)	Min	D 2042	99	99	99
TFOT heating for 5 hr at 163 ⁰ C		D 1754			
a) Loss by mass (%)	Max		0.5	0.5	0.5
b) Penetration (% of original)	Min	D5	58	54	50
c) Ductility at 25 ⁰ C	Min	D 113	-	50	75

The bitumen for asphalt concrete works shall be 60/70 penetration grade. The Contractor jointly with the Engineer shall carry out a minimum of five (5) bitumen affinity tests on each single size aggregate stockpiles to be used into the works and if any result is less than 95% coverage, then the binder shall be blended with **ColAmin** or similar approved adhesive additive as per manufacturer's instructions at 0.2 - 0.5% by mass of binder. The Contactor shall propose optimum dosage of the adhesive additive by carrying out bitumen affinity tests on the crushed aggregates for approval by the Engineer

b) Aggregate

The coarse aggregate shall be entirely crushed rock from a source which is known to give high values of stability (>9kN) in the Marshall test. Crushed river gravel shall not be used. Aggregates shall meet the requirements given in Table 16B-1(b) below (Extracted from ORN 19, Table 4.1)

Table 16 B-1(b) Requirements of Aggregate

Property	Test	Property
Cleanliness	Sand equivalent for 4.75mm fraction ¹	> 40
	Plasticity index for materials passing 0.425mm sieve ²	<4
	Linear shrinkage for materials passing 0.425mm sieve, %	<2
Particle shape	Flakiness Index (FI) ³	<25
Strength	Aggregate Crushing Value, (ACV) ⁴	< 25
	Aggregate Impact Value, (AIV) ⁴	<25
	10% FACT (dry) kN ⁴	> 160
	Los Angeles Abrasion, (LAA) ⁵	<30

Abrasion	Aggregate Abrasion Value ⁴	< 14
Soundness ⁷	Sodium Sulphate Soundness (SSS) Coarse aggregate	<10
	Sodium Sulphate Soundness (SSS) Fine aggregate	<16
5cycles	Magnesium Sulphate Soundness (MSS) Coarse aggregate	<15
% loss	Magnesium Sulphate Soundness (MSS) Fine aggregate	<20
Polishing	Polished Stone Value	>57
Water absorption	Water absorption , % ⁶	<2
Bitumen affinity	Immersion Mechanical Test: Index of retained Marshall stability ,% ⁸	>75
	Static Immersion Test, % coating retained ⁹	>95
	Retained Indirect Tensile Strength % at 7% VIM ¹⁰	>79

1. AASHTO T176
2. British Standard 1377: Part 2
3. British Standard 812: Part 105
4. British Standard 812: Part 110 to 114
5. ASTM C131 and C 535
6. British Standard 812: Part 2
- 7.AASHTO T104
8. D Whiteoak (1990)
- 9.AASHTO T 182
- 10.AASHTO T 283

Fine aggregate (passing a 6.3mm sieve) shall consist of entirely crushed rock produced from stone having a Los Angeles Abrasion of not more than 40%

Aggregates for bituminous mixes shall be stored in single size in separate bins or on areas covered with tightly laid wood planks, sheet metal, hard compacted gravel, concrete or other hard and clean surfaces. The surface shall be self draining, and in such a manner that will preclude the inclusion of foreign material. Aggregates of different grades and sizes and from different sources shall be stored in separate piles, and if these piles are close together they shall be separated by bulk heads

1603B GRADING REQUIREMENTS

The grading of the mixture of coarse and fine aggregate shall be as per the particle size distribution for SUPERPAVE Gradation Requirements detailed under table 6.3 of MS2

For better workability of asphalt concrete designed to refusal density and for laying thickness of 50mm, the Maximum Aggregate Size (MAS) shall be limited to 19mm

The Contractor shall investigate number of gradings so that a workable mix, which also retains a minimum of 3% voids at refusal density, is identified. Restricted Zone boundaries shown under table 3.3 of MS2 shall be used as guidance towards identifying a such a grading

1604B REQUIREMENTS FOR ASPHALT CONCRETE

The mixture shall comply with the requirements given in table 6.5, MS2. Adopt 20-year ESAL (in millions) as 4.9

In addition, under Marshall Mix Design Criteria, the mixture shall comply with the requirements given in table 7.2, MS2

The proportion, by weight of total mixture, of bitumen shall be 4.5 - 6.0 % for 19mm MAS. This shall be termed the nominal binder content. The binder content of the working mix will be instructed by the Engineer following laboratory and site trials.

In order to determine the suitability of a coarse aggregate source, a Marshall test programme shall be carried out. It will be advantageous to use crushed rock, which is known from past experience to give good results

Having established the suitability of the aggregate source several gradings shall be tested in the laboratory, including that used for the Marshall test. The blended grading shall include coarse, intermediate and fine grading that pass below the restricted zone, which shall increase the degree of interlock. For each mix, samples shall be made up to a range of bitumen contents at reducing interval of 0.25% from the nominal binder content and compacted using a gyratory compactor. Compaction to refusal shall be by vibratory hammer in accordance with the procedure described in BS 598 (Part 104: 1989), to establish relationships between bitumen content and VIM at refusal density for all the gradings

It should first be confirmed that compaction on one face of the sample gives the same refusal density as when the same compaction cycle is applied to both faces of the same sample. The procedure, which gives the highest density, must be used and shall be submitted to the Engineer for approval

From the above bitumen content - VIM @ refusal density relationship, it shall be possible to identify a bitumen content which corresponds to VIM of 3% for each grading.

To determine the workability of the mix, compaction trials should be undertaken in these gradings with designed binder content @ 3% VIM. It is advisable to establish two or more gradings for compaction trials

The compaction trials will identify a workable mix which can be made to a bitumen content which gives 3% VIM at refusal density and meeting the SUPERPAVE mixture requirements. The mixes identified in compaction trials should be manufactured to the laboratory design bitumen content and to two other bitumen contents. Cores will be cut to determine the density of the compacted material, this core will then be reheated to $145 \pm 5^{\circ}\text{C}$ in the appropriate mould and compacted to refusal using the vibrating hammer. To be acceptable the cores cut from the compaction trial must have a density equivalent to at least 95% of refusal density

The results of all the mix design options, laboratory and site trials for the adopted mix and the Contractor's recommendations are to be submitted to the Engineer for approval

1605B MIXING AND LAYING ASPHALT

The temperature of the bitumen and aggregates when mixed shall be $110 \pm 3^{\circ}\text{C}$ above the softening point (Ring and Ball) of the bitumen

Compaction should commence as soon as the mix can support the roller without undue displacement of material and with the temperature of the mix $>120^{\circ}\text{C}$, and completed before the temperature of the mix falls below 90°C .

1606B COMPACTION

Rolling shall be continued until compaction of the completed layer attains a minimum mean value of 95% of refusal density (no value less than 93%) and until the voids measured in the compacted layer are within the specified range as appropriate

1608B SEALING BITUMINOUS SURFACE

After the wearing course has been trafficked and bitumen has hardened, the wearing course shall be sealed with class 2, 10/14 mm pre-coated chippings in accordance with Clause 1505C. The period of hardening will depend on the traffic level and should be such that the chippings will not become embedded in the wearing surface. The Contractor will propose and the Engineer will approve a section to be ready for sealing

PART C – DENSE BITUMEN MACADAM FOR BASE

1601C DEFINITION

Dense bitumen macadam produced from fresh materials shall comply with the “SUPERPAVE” requirements given in clauses 1602B, 1603B, 1604B, 1605B, 1606B and 1608B of these Special Specifications, except where modified below.

1603C REQUIREMENTS FOR DENSE BITUMEN MACADAM

The nominal binder content shall be 4.0 - 5.0 % for 37.5mm MAS. The binder content of the working mix will be instructed by the Engineer following laboratory and site trials

For Marshall Mix Design Criteria, Modified Marshall Method for large aggregates shall be adopted as detailed under section 7.5 of MS2

The Maximum Aggregate Size (MAS) shall be limited to 37.5mm

SECTION 17 - CONCRETE WORKS

1703 MATERIALS FOR CONCRETE

All materials shall comply with the requirements of Section 1703 of the standard specifications.

Cement for all concrete works shall be CEM I, 42.5N Portland Cement manufactured to KS EAS 18-1: 2001 - Part 1, KS 1725: 2001 standards

1703 DESIGN OF CONCRETE MIXES

The following classes of concrete shall be designed and mix proportions approved for use as follows:

- Class 15/20 for all blinding to structures and precast pipe culvert beds and surrounds
- Class 25/20 for all culvert headwalls, wing walls, aprons, toe walls
- Class 30/20 for bridge all bridge members: abutments, piers, beams and deck

Specifications for construction materials and quality control shall be in accordance with the standard specifications.

1704 DESIGN OF CONCRETE MIXES

The following classes of concrete shall be designed and mix proportions approved for use as follows:

Blinding to all structures - Class 16/20

Culvert headwalls, Surround, wing walls, aprons, toe walls - Class 20/25

Pile caps, Abutments, Wing walls, Pier caps, bearing pedestal, Crash barrier, walkway on bridge, Approach Slab and Box Culverts - Class 30/37

Piles – Class 30/37

Bridge Piers, Girders and Deck – Class 35/45

Specifications for construction materials and quality control shall be in accordance with the standard specifications.

1713 FINISHES ON UNFORMED SURFACES

All unformed finishes shall be as follows:

- (i) All unformed surfaces in contact with water or the eye shall be finished to class UF 3 Finish in accordance with the standard specifications
- (ii) All unformed surfaces in contact with soil or on which asphaltic concrete is to be laid shall be finished to class UF 2 Finish in accordance with the standard specifications

The payment for such finishes shall be paid in accordance with the standard specifications and as captured in the bills items.

1725 SURFACE FINISHES

All formed finishes shall be as follows:

- (i) All formed finishes in contact with water or the eye shall be finished to class F3 finish in accordance with the standard specifications.

- (ii) All formed surfaces in contact with soil shall be finished to class F 2 Finish in accordance with the standard specifications

The payment for such finishes shall be paid in accordance with the standard specifications and as captured in the bills items.

1728 REINFORCEMENT FOR CONCRETE

All reinforcement to concrete shall be hot rolled high yield deformed bars complying with BS 4449 and steel mesh fabric to BS 4483

1741 MEASUREMENT AND PAYMENT

a) Item: Concrete

Amend clause 1741 (a) (iv) of standard specifications to read “class UF 3 finish”

b) Item: formwork for formed surface finishes

Amend the following to Clause 1741 (e) of the Standard Specification:

Unit m² of formwork shall cover inclined formwork of all slopes and angles.

SECTION 19 – STRUCTURAL STEEL

1901. APPLICABLE STANDARDS.

The latest applicable corresponding standards shall be applicable in lieu of those indicated in the Standard Specifications. In particular the following standards shall be applicable:

a) Steel

EN 10021, EN 10025-1, EN 10025-2

EN 10025-3

EN 10025-4

EN 10029 EN 10034 EN 10051

EN 10056-2 EN 10163-1

EN 10163-2 EN 10163-3

EN 10204 BS 4-1

(b) Bolts, Anchor rods, Nuts and Washers

EN ISO 898-1

EN 20898-2

EN 14399-1, EN 14399-2

EN 14399-4

EN 14399-6

EN ISO 4017

EN ISO 4034, EN ISO 4032

DIN 7989-1

EN ISO 4026 DIN 976-1 DIN 125 DIN 529

(c) Galvanizing

EN ISO 1461, EN ISO 10684

(d) Elastomer

EN 1337-3

Structural bearings - Part 3: Elastomeric Bearings.

SECTION 20 - ROAD FURNITURE

2001 ROAD RESERVE BOUNDARY POSTS

Road reserve boundary posts shall be provided as directed by the Engineer and in compliance with Standard Specification clause 2001. They shall be placed at 100m intervals along the boundary of the road reserve.

2003 EDGE MARKER POSTS

Edge marker posts shall be Verge Master MK 111 plastic posts manufactured by Glasdon Ltd. of Blackpool UK or equivalent approved by the Engineer. They shall be provided as directed by the Engineer and in compliance with the requirements of Standard Specification clause 2003

2004 PERMANENT ROAD SIGNS

Permanent Road Signs shall be provided as directed by the Engineer. The sign face material shall be Reflective Sign Sheeting Complying with ASTM Type XI Standards. The signpost shall be Chromated Copper Arsenated (CCA) treated wooden/timber poles from a fabricator approved by the Engineer. The sign frame shall be made of treated timber.

The road signs shall be obtained from a manufacturer approved by the Engineer. Before placing any order for the manufacture of the road signs, the Contractor shall submit to the Engineer the following information:

1. Name of the firm from which the Contractor proposes to obtain the signs together with the place of manufacture or fabrication
2. A description of the items to be used together with the manufacturer's specification and a description of quality, grade, weight and strength
3. Manufacturer's type test certificates
4. A sample sign, posts and fittings which sample shall be stored by the Engineer.

2004B EXISTING ROAD SIGNS

Where directed by the Engineer, the Contractor shall take down road signs including all posts, nuts, bolts and fittings, and remove and dispose of the concrete foundation and backfill the post holes. The signs shall be stored as directed by the Engineer.

Measurement and payment for taking down road signs shall be made by the number of signs of any type and size taken down, cleaned and stored as directed.

2005 ROAD MARKING

Paint for road marking shall be internally reflectorized hot applied thermoplastic material in accordance with Clause 219 of the Standard Specification complying to BS 3262 and BS 6088.

The rates inserted in the Bills of Quantities for road marking shall include for prior application of approved tack coat.

2006 GUARDRAILS

Guardrail posts shall be concrete 210 x 210 mm set vertically at least 1.2m into the shoulder as per the drawings and as directed by the Engineer.

Beams for guardrails shall be "Armco Flexbeam" or similar obtained from a manufacturer approved by the Engineer.

“Swareflex” ART 3240 or similar approved guardrail reflectors two way reflective one side red and another white shall be installed on the flex beams every 4m.

The rate inserted shall include for provision of the flex beams, posts, Swareflex reflectors, flex beam end bits and installation in accordance with the standard specifications and drawings.

2007 KERBS

(a) Vertical Joints

Vertical joints between adjacent kerbs shall not be greater than 5 mm in width and shall mortar consisting of 1:3 cement: sand by volume.

(b) Transition between flush and raised kerbs

The transition between flush and raised kerbs (e.g. at bus bays) shall be termed as ramped kerbs and shall occur within a length of 2.0m

2008 KILOMETRE MARKER POSTS

Kilometre marker posts shall be provided as directed by the Engineer and in compliance with Standard Specification Clause 2008.

2011 BOLLARDS

Where directed by the Engineer, the contractor shall provide and install class 20/20 200mm diameter reinforced concrete bollards concreted 300mm into the ground.

SECTION 21 - MISCELLANEOUS BRIDGE WORKS

2102 BRIDGE BEARINGS

Add the following

The bridge bearings shall be laminated elastomeric bearings to BS EN 1337-3

Structural bearings - Part 3: Elastomeric Bearings.

The contractor shall have the source of the bearings approved by Engineer and shall provide the engineer with a sample as shall be instructed for destructive testing. Upon importation of the bearings the engineer shall do random sampling for another sample for destructive testing to confirm the quality of the bearings to be used on the bridge.

The contractor shall make provision for the samples and their testing in his rates for other bearings since no separate payment shall be made for the test samples and their testing.

2105 GUARDRAILS TO BRIDGES

Delete and replace with the following:

The bridge crush barriers shall be of reinforced concrete as shown on drawings and shall be of the same concrete specification as for the concrete deck slab.

Their measurement and payment shall be in cubic metres under the relevant item under bill number 17.

2106 SURFACING TO BRIDGES

The surfacing to bridges shall consist of 50 mm thick Asphalt Concrete laid to the tolerances given in Section 3 of the Standard Specification.

SECTION 21A - MISCELLANEOUS BRIDGE WORKS-PILING

Add this as a subsection to Section 21.

2100 A.1 GENERAL

The following shall be taken into consideration in the piling works for bridges. The piling works shall be carried out in accordance with the provisions of BS 8004 or other approved code subject to the approval of the engineer. The piles shall be bored cast-in-place or as approved by the engineer.

2100 A. 2 BORED CAST-IN-PLACE PILES

Bored cast-in-place piles shall be formed by boring or grabbing and subsequently filling the hole with reinforced concrete. Piles diameters as shown on drawings shall be used.

Ready-mixed concrete shall be used with the approval of the engineer and shall be in accordance with BS 5328. The concrete shall be supplied in sufficient quantity to ensure that the concreting of each pile proceeds without interruption. In addition to meeting the strength requirements the concrete shall have adequate workability so that it can flow against the walls of the shaft, and into every cavity. The slump shall be as per the approved mix design. The minimum characteristic strength requirement at 28 days shall be 30 N/mm².

Table 14 — Suggested slump details for typical concreting situations for cast-in-place piles

Typical conditions of use	Slump	
	Range	
	mm	in
Poured into water-free unlined bore. Widely spaced reinforcement leaving ample room for free movement between bars	75 to 125	3 to 5
Where reinforcement is not spaced widely enough to give free movement between bars.		
Where cut-off level of concrete is within casing.		
Where pile diameter is less than 600 mm	100 to 175	4 to 7
Where concrete is placed by tremie under water or bentonite suspension	150 to collapse	6 to collapse

Generally the concrete shall contain not less than 300 kg/m³ cement. To avoid segregation, honeycombing and bleeding, and other defects resulting from the high water content required for workability, the use of a water reducing/plasticizing admixture shall be used upon the approval of the engineer. However, to ensure the required cohesion of the mix the fines content of cement or aggregate shall also have to be increased subject to the approval of the engineer.

The engineer shall have access for inspection to the supplier's works at all times.

The reinforcement shall be carried down for the full length of the piles using approved method. Spacer rollers shall be attached to the reinforcement cage to ensure cover to reinforcement.

2100 A. 3 PILE LOAD TESTING USING MAINTAINED LOADS AND SETTLEMENT MEASUREMENT

Working piles shall be tested as instructed by the engineer. At least one working pile shall be tested for every foundation location. In testing the following shall be ensured.

i) Preparation. The pile head shall be cut off or built up to the necessary elevation and shall be capped appropriately to produce a bearing surface perpendicular to the axis of the pile. The arrangement shall be such that none of the test load is carried by the ground under the cap.

ii) Method of loading. The test load may be applied in one of the following ways or any other approved by the engineer:

- a) by means of a jack which obtains its reaction from kentledge heavier than the required test load;
- b) by means of a jack which obtains its reaction from tension piles or other suitable anchors.

The load shall be measured by a calibrated load gauge and also by a calibrated pressure gauge in the hydraulic system. The jack and load gauge shall be carefully aligned so that the load applied is co-axial with the pile.

When using method a) care shall be taken to ensure that the centre of gravity of the kentledge is on the axis of the pile. The nearest edge of the crib supporting the kentledge stack shall not be closer than 1.3 m to the surface of the test pile. Kentledge shall not be used for tests of raking piles. In appropriate circumstances an existing structure of adequate mass and suitable construction may be used as kentledge.

When using method b) all anchor piles shall be at a distance of at least three test pile shaft diameters from the test pile, centre to centre, and in no case less than 2 m. This spacing may need increasing in certain situations where knowledge of the absolute value of settlement of an individual pile is essential.

Where a pile to be tested has an enlarged base the same criterion should apply with regard to the shaft and, in addition, the surfaces of anchor pile shafts shall not be closer than one-half of the diameter of the enlarged base to the test pile base. If the anchor piles are to be permanent working piles, their level should be observed during application of the test load to ensure there is no residual uplift. Where ground anchors are employed with method b), no part of the anchor transferring load to the ground shall be closer to the test pile than 3 test pile shaft diameters.

Where the pile to be tested has an enlarged base this criterion shall apply with regard to the pile shaft and, in addition, no section of the anchor-transferring load to the ground should be closer to the pile base than the base diameter.

iii) Measurement of settlement.

Settlement shall be measured by one of the following four methods.

a) Level and staff. The level and the scale of the staff shall be chosen to enable readings to be made to an accuracy of 0.5 mm. A scale attached to the pile or pile cap may be used instead of a levelling staff. A datum shall be established on a permanent object or other well-founded structure or deep datum point. The datum shall be situated so that only one setting up of the level is needed. It is preferable that the datum shall be duplicated in case one is inadvertently demolished. The datum shall not be affected by the test loading or other operations on the site.

b) Reference frame. A frame shall be supported on two foundations or stakes placed sufficiently far from the pile and the reaction system as to be unaffected by ground movements resulting from the test; the distance shall be not less than 3 test pile diameters and in no case less than 2 m.

The foundations or stakes shall be placed at a sufficient depth below ground to be unaffected by movements of the reaction system and movements of the ground caused by moisture changes or frost. The measurement of settlement is made by dial gauges fixed to the frame and bearing on the top of the pile, or lugs or other reference points on the pile to register the movement of the pile. If preferred the gauges may be fixed to the pile and bear on surfaces on the reference frame. Electrical displacement transducers can be used in place of dial gauges. Readings should be taken to an accuracy of 0.1 mm. During the test, observation of any movements of the stakes with reference to a datum as in a) above shall be made by means of a level and staff.

c) Reference wire. A strained high tensile wire may be used instead of the reference frame. The wire is positioned against a scale fixed to the pile and the movement of the scale relative to the wire is determined. Readings shall be taken to an accuracy of 0.5 mm.

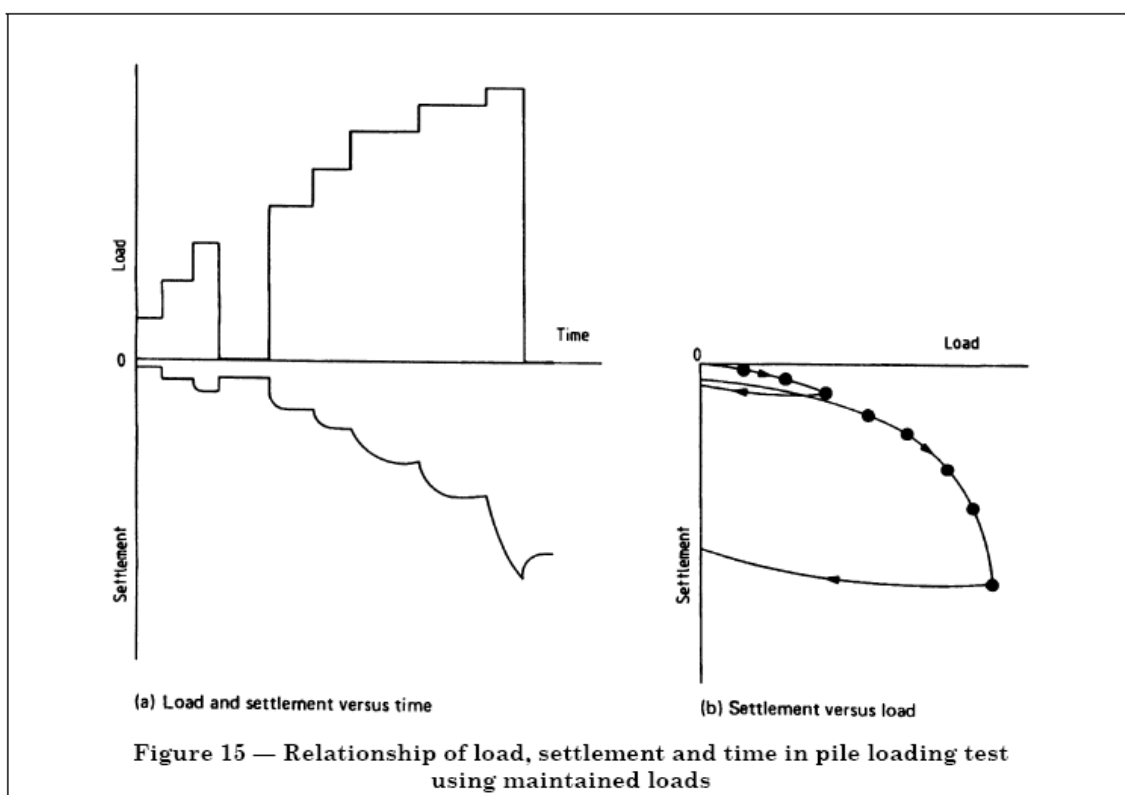
d) Electro-optic position sensing. A laser beam focused by a lens attached to the pile may be used to produce an image on a photoelectric detector. Movement of the pile produces an electrical signal proportional to the movement. The foundations for the laser and detector units shall be as described under b) above but it is convenient and likely to lead to greater accuracy if they are placed at least 10 test pile diameters from the test pile.

Where method b) or c) is used, protection of the frame or wire from sun and wind shall be made and variations in the air temperature shall be recorded.

Loading Procedure. The engineer shall state the working load and prescribe the stages of loading. It shall be convenient to make the increments of load about 25 % of the working load up to the working load, and appropriately smaller thereafter as shall be determined by Engineer. Each load increment shall be sustained for at least 15 minutes and readings taken. The pile shall be unloaded and reloaded after the completion of any stage of loading. The reloading shall be at least 1.5 times the working load and shall be sustained for at least 20 hours with readings being taken as appropriate but at least every 60 minutes. Three readings shall be taken for each load increment at intervals of 5 minutes in both cases before another increment is done.

During unloading, readings of time and settlement should be made at suitable intervals and, after removal of the load, readings shall be continued until the movement effectively ceases.

On completion of the necessary stages of loading a pair of graphs showing load and settlement versus time as abscissa shall be plotted as indicated in Figure 15(a). A graph of load versus the settlement at the end of each stage of loading shall be plotted as in Figure 15(b). These shall form integral part of the report to be produced on the works.



21A. 4 PILE INTEGRITY TESTING

All piles shall be subjected to pile integrity testing using an approved method subject to the approval of the engineer. An expert firm approved by the engineer shall do the pile integrity testing and a comprehensive report shall be produced.

SECTION 22-DAYWORKS

2202 MEASUREMENTS AND PAYMENT

(a) Plant

Where items of major plant listed in the schedule of Dayworks are specified by type (e.g. Concrete mixer etc.) the power rating of such items of plant provided by the Contractor shall not be lower than the power ratings of such plant manufactured within the last two years prior to the date of BID. Any item of major plant employed upon Dayworks that has a power rating lower than specified above shall be paid for at rates lower than those in the schedule of Dayworks. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above.

SECTION 25 - HIV/AIDS, GENDER ISSUES, SOCIAL ISSUES AND LOCAL PARTICIPATION

2501 SCOPE

This specification sets out the Contractor's obligations with regard to on-site HIV/AIDS awareness campaign and preventive measures which are to be instituted.

2502 INTERPRETATION AND DOCUMENTATION

The following documents shall inter-alia be read in conjunction with this specification:

- The Instructions to Bidders;
- The Conditions of Contract;
- The Drawings;

2503 GENERAL REQUIREMENTS

(a) HIV/AIDS Awareness Campaign

The Contractor shall institute an HIV/AIDS awareness campaign amongst his workers for the duration of the contract. As part of the campaign the Contractor will be required to display AIDS awareness posters in all buildings frequented by workers employed on the contract, where such buildings fall under the control of the Contractor. In addition, at least ten (10) of the Contractor's vehicles, regularly used on site shall display HIV/AIDS awareness posters. The posters shall be printed on gloss paper and shall be at least A1 size on buildings and A3 size, or other approved size on vehicles. The message on the posters shall be supplied by the Employer through the Engineer before the posters are printed.

Aids awareness shall also be included in the orientation process of all workers employed on the contract.

(b) AIDS Prevention Campaign

The Contractor shall institute an HIV/AIDS prevention campaign amongst his workers for the duration of the contract. As part of the campaign the Contractor will be required to make condoms available to workers. The condoms shall be from an approved manufacturer and comply with the current ISO Standards or WHO/UNAIDS Specifications and Guidelines for Condoms, 1998, or any more recent publication. The Contractor shall make available at least 4,000 condoms every month, through dispensing machines or other approved method of distribution. The Contractor shall at all times keep the site adequately supplied with condoms.

(c) HIV/AIDS Training

Introduction

HIV/AIDS is having a significant and increasing impact in Kenya. Interventions that stimulate the movement of people increase both the exposure to the HIV virus and the spread of the virus. Road construction has been identified as one such intervention.

KeNHA policy is to integrate HIV/AIDS awareness and prevention into all road construction and rehabilitation programmes. This is in accordance with the Third National Strategic Plan (2000-5) for HIV/AIDS prevention and control as approved by the Government of Kenya, International Bank for Reconstruction and Development (IBRD) and other organisations.

The project will involve both local labour and other contractor's labour. It is a contractual requirement for the Contractor to carry out HIV/AIDS awareness and prevention activities during the construction period as stipulated in this specification.

Objective

The objective of the HIV/AIDS training programme is to reduce the risk of exposure to and spread of the HIV virus in the area influenced by the construction. The target group will be local labourers and their supervisors employed by the works contractors. The wider community will benefit indirectly through their normal day-to-day interaction with the target group.

Scope of activities

Activities for HIV/AIDS awareness and prevention will be broad-based, targeting both individuals and groups. They may consist of:

- (i) Information posters in public places, both on and offsite (eating houses, bars, guest houses, etc.) and on contractor's vehicles.
- (ii) Availability of socially marketed condoms.
- (iii) Peer educators (reference people) drawn from the local labour and educated in HIV/AIDS issues for discussions with colleagues (estimate 1 per 50 employees).
- (iv) Small focus group discussions to disseminate information covering key issues.
- (v) Theatre groups and video presentations.
- (vi) Promotional events (such as football matches) to encourage openness and discussion of HIV/AIDS issues.
- (vii) Promotional bill boards to raise awareness of the integration of construction and HIV/AIDS activities.
- (viii) Inclusion of HIV/AIDS activities at site meetings with the District Aids Committee and other approved representatives.
- (ix) Availability of promotional materials such as T-shirts, caps, bumper stickers, key rings, etc.

The scope of activities may be tailored as required to meet the perceived needs and priorities of the labourers, and should involve participatory approaches to ensure that they are appropriate and have a public health impact. The scale and frequency of activities may also be adjusted to suit requirements of the target group. Education will cover:

- (a) preventive behaviors including partner reduction, condom use, awareness and appreciation of the importance of treatment of sexually transmitted infections (STIs);
- (b) skills including negotiating safer sex, correct condom use, purchase of condoms without embarrassment; and
- (c) referral to local health centres and available services.

Tasks to be undertaken to support the above activities include:

- (a) Establishing the status and focus of all current and planned HIV/AIDS activities in the area to ensure complementarity and determining potential involvement in project activities.
- (b) Carrying out a brief review of regional activities combining road construction with HIV/AIDS campaigns to determine options, best practice key issues, constraints, etc.
- (c) Reviewing of Information, Education and Communication (IEC) materials available and their relevance to road construction, making recommendations for future development of IEC materials.
- (d) Providing education and training for site personnel, supervisors and peer educators for the scope of activities as above.
- (e) Providing supervision for peer educators to ensure sustained quality of education. Incentives for their continual work may be small promotional items such as T-shirts, caps, etc.
- (f) Providing mechanisms for the social marketing of condoms and distribution of materials.
- (g) Monitoring activities regularly to assess effectiveness and impact. This should include an initial, interim and final assessment of basic knowledge, attitude and practices (KAP) taking account of existing data sources and recognising the limitations due to the short time-frame to show behaviour change. The KAP will be supported by qualitative information from focus group discussions.

Collaboration

HIV/AIDS activities are co-ordinated nationally by the National Aids Control Council (NACC). KeNHA, in consultation with NACC and the Ministry of Health (MOH), will co-ordinate with the provincial, district and local representatives. Representatives of local health authorities will be invited to attend training and communication activities.

Activities on the construction site will be linked as far as possible with on-going HIV/AIDS awareness and prevention in the area. This will ensure complementarity of approaches, reinforcing education and minimising duplication. In addition, these links will ensure that the target group will have access to continued information after the end of the construction period.

Contractor Responsibilities

The Contractor will employ and designate a qualified HIV/AIDS expert fulltime, to be approved by the Engineer, who will work closely with the Client, MOH and other implementing agencies to support the HIV/AIDS awareness and prevention activities. This will ensure maximum effectiveness and integration with construction activities. Specific, but not exclusive, issues to be addressed by the Contractor are:

- (i) Scheduling appropriate timing and durations of the implementation of HIV/AIDS activities as part of work plan for labourers and supervisors. Designated rest times such as lunch breaks and pay days should be excluded.
- (ii) Identification of suitable individuals from recruitment records for education with the implementing organization.
- (iii) Provision of suitable sites for communication activities and for condom distribution.
- (iv) Monitoring of the implementation of peer educator activities.
- (v) Provision of support as necessary to the implementing organization.

Inputs

An organization experienced in the provision of HIV/AIDS awareness and prevention activities will be selected as a subcontractor to provide the above scope of activities on behalf of the main Contractor.

Reporting

The implementing organization will produce the following reports to be submitted to the Contractor, The Engineer, KeNHA and NACC:

- monthly progress briefs for inclusion in site meetings.
- quarterly reports detailing activities carried out, issues, follow up, etc.
- a review report of activities in the road construction sector,
- a review report of existing IEC materials with recommendations for development of materials specifically for the road sector.
- a final report detailing the methodology and activities carried out under this project including lessons learnt, impact, liaison with the Contractor and other parties, etc.

In addition, a report with the recommended approach for integration of HIV/AIDS awareness and prevention activities in the road construction sector will be produced. This will be a synthesis of project activities including contractual approaches, communication activities, availability of materials, liaison with existing organisations, etc. It will be developed with all parties involved in the construction activities to ensure the wide range of views and experiences is gained.

The final report and recommended approach will be presented to KURA, NACC and other interested organisations including private sector, funding agencies and NGO's.

Timing

Activities shall commence at the start of the construction period and continue throughout the 24 months to ensure a sustained impact. Reporting and dissemination activities shall continue for three months after the project is completed to ensure integration into current practice.

2504 MEASUREMENT AND PAYMENT

The payment items in this clause shall include full compensation for all work associated with the provision of HIV/AIDS related services as specified.

Item: Instituting an HIV/AIDS awareness and prevention campaign

Unit: months

The unit of measurement shall be the calendar month or part thereof, measured over the duration of the campaign. The tendered rate shall include full compensation for equipment, labour, materials including the procurement and distribution of condoms and full compensation for transport, meals, accommodation and any other reasonable allowances for the Participation of

local health authorities, provincial director of health and NACC and other resources required for the provision of the service in compliance with clause 2503 (a) & (b) above.

Item: Instituting an HIV/AIDS Training – Engagement of specialist HIV/AIDS sub-contractor

Unit: Provisional Sum

Compensation for HIV/AIDS Specialists and resources for the implementation of Clause 2503(c). Any amount required under this item will be paid as per the programme approved by the Engineer and the Client (KeNHA) prior to expenditure.

SPECIAL SPECIFICATIONS FOR BUILDING WORKS

GENERAL DESCRIPTION OF MATERIALS AND WORKMANSHIP

The following apply to all sections hereafter

QUALITY, SAMPLES, TESTING AND APPROVAL

A. Materials

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

B. Manufacturer's Recommendations

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

C. Standards.

Where commodities or workmanship are specified by reference to British Standards (B.S.) or Codes of Practice (C.P) or International (I.S.O.) or other standards, such standards are deemed to be the last published at the time of tendering. The Contractor will be deemed to have read and understood the standards specified, and no claim for want of knowledge will be allowed. The substitution of commodities or standards of workmanship complying with other standards may be allowed at the discretion of the Engineer, but application for permission for such substitution must be made in writing in sufficient time to allow adequate investigation. Obtain Certificates of Compliance with standards and supply to the Engineer on request.

D. Local Conditions

All materials, commodities, components and equipment must be suitable for use in tropical climates

E. Samples

Where samples of commodities or specimens of finished work are specified, submit samples or specimens to the Engineer and obtain his approval before confirming orders or carrying out the work. Retain approved samples and specimens on Site for comparison with the finished work. Finished work must conform in all respects with the samples or specimens approved. Remove samples and specimens when no longer required. The cost of supplying samples and specimens must be borne by the Contractor, but specimens may form part of the finished work where approved by the Engineer.

E X C A V A T I O N S AND EARTHWORKS

A. Examine the Site

The Contractor is assumed to have examined the site carefully and ascertain for himself its nature and the kinds of materials to be excavated.

B. Excavations

Excavations shall be to the widths and depths indicated on the Drawings or to such lesser or greater depths as the Engineer may deem necessary and so instruct the Contractor in order to obtain satisfactory foundations.

Any difference in the quantity of work actually executed under such instructions and that shown on the drawings shall be measured and valued by the Engineer as a Variation under the relevant Conditions of Contract and priced in accordance with the Schedule of Rates.

If, however, the Contractor excavates to any greater depths or widths than are shown on the Drawings or directed, then the Contractor shall, at his own expense, satisfactorily fill in such extra depth and width with concrete similar to that described for foundations.

C. 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 is specified, the underside of the base. Any excess depth unnecessarily excavated below formation level shall be backfilled with material acceptable for construction and compacted as directed by the Engineer and no payment shall be made for the excess excavation or for the filling and compacting. The levels and tolerance of irregularity of the surface of the course shall be within the limits specified in Clause 6.17 for sub-grade.

D. Surface Soil

Unless otherwise directed by the Engineer all surface soil shall be removed from the area to be used for cuttings and embankments and stockpiled for re-use and for any purpose such as the soiling of slopes of cuttings and embankments, herms, verges, central reserve and the preparation of beds for the cultivation of trees and shrubs.

Surface soil shall be regarded as soil which on visual examination can be seen to have been broken down by agricultural cultivation and/or is seen to be capable of supporting vegetable growth.

Surface soil shall be removed to an average depth as shown on the Drawings or specified in the Bills of Quantities.

The Contractor shall make his own arrangements for temporary storage sites for heaps of surface soil either inside or outside the Site of the Works to suit his convenience. The cost of all operations needed in excavating, loading, carting, depositing and stacking, together with arranging for the storage sites, the hire or purchase of land therefore and all necessary access roads for this purpose is to be included in the item in the Bills of Quantities for stripping surface soil and is to be quoted whatever the nature of the underlying sub-soil.

All unsuitable soil comprising or underlying surface soil shall be excavated and run to spoil in accordance with Clause 2.7.

E. Bottoms of Excavations to Receive Foundations

The Contractor shall report to the Engineer when secure bottoms to the excavations have been obtained. Any concrete or other work executed before the excavations have been inspected and approved shall, if so directed, be removed and new work substituted after the excavations have been approved, all at the Contractor's expense.

The surface of the bottoms to excavations to receive foundations shall be levelled or graded to falls as required.

F. Soiling of Side Slopes and Verges

Soiling and compacting of the side slopes of cuttings and embankments shall be carried out to an even surface with a thickness within the range 100mm – 200mm, or in the case of verges as stated in the Bills of Quantities with surface soil as previously stockpiled or from an approved source.

Grass planting shall be carried out in accordance with Clause 7.19.

G. Rock

Excavation in rock shall exclude all materials which can be removed by hand and does not necessarily require the use of compressors or other mechanical equipment, although the Contractor may use such equipment to loosen the material for ease of its removal. All topsoil, black cotton and other clay soils, murrum, stone and other fill and all similar materials will NOT be classified as rock.

H. Definition and Classification of Excavated Material

Excavation in solid rock in the Bills of Quantities will be itemised in three Classes: -

(i) Class I:

Soft rock of the type known locally as “tuff” or “magadi” which in the opinion of the Engineer cannot be considered as hard rock but which considerably increases the amount of labour needed for its removal shall be known as Class I rock. Murrum and Kunker is specifically excluded and will be reckoned as common excavation.

(ii) Class II:

Very weathered blacktrap or lava containing many fissures and faults shall be known as Class II rock. This type of rock contains stones and boulders of unweathered or incompletely weathered blacktrap or lava. A boulder or outcrop of harder rock 13.5 cu. Metre or less, and first quality Nairobi blue, grey or green building stone in a formation which is massive and geologically homogenous, will be deemed to be Class II rock.

(iii) Class III:

Blacktrap in a formation which is massive and geologically homogenous shall be known as Class III rock.

NOTE: The opinion of the Engineer in classifying rock shall be final and binding.

Common excavation shall mean excavation in any material which are not solid rock as defined in this Clause.

All excavation shall be classified either as unsuitable materials or as suitable material. Unsuitable material shall comprise: -

- (i) Material from swamps or marshes, silt, perishable material, slurry or mud; or
- (ii) Any material: -
 - (a) Which is highly organic clay or silt;
 - (b) Which is clay having a liquid limit exceeding 8. and/or a plasticity index exceeding 55;
 - (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 by virtue of its physical or chemical composition or moisture content will not compact to form a 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 without the Site. Any reference in this and other Clauses of the Specification to suitable material and unsuitable material shall have the meanings defined above.

For the purpose of selection for use in earthworks 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 text and shall include “coarse-grained, non-cohesive materials” included in Table 1 of British Standard Code of Practice CP 2.1:

The Engineer’s decision shall be final with regard to the classification of excavated materials.

I. Excavation of Cuttings

The Contractor shall carry out the excavation of cuttings in accordance with the Drawings and shall adhere to the slopes, levels, depths and heights shown thereon.

The sloping sides of all cuttings shall be cleared of all rock fragments which move when prised with a crowbar and are therefore liable to cause injury or damage through falling.

NB: No blasting will be permitted without the prior approval of Local Authorities and Engineer.

J. Cart Away

All surplus excavated material shall be removed to spoil, within the site as directed by the Engineer.

K. Filling Obtained from the Excavations

Filling obtained from surplus excavated materials will only be incorporated if suitable material arises and is to be free from all weeds, roots, vegetable soil or other unstable materials and is to be filled in layers each of not more than 225 mm finished thickness. Each layer to be well wetted and consolidated as described. Filling obtained from surplus excavated materials will only be incorporated if suitable material arises and is to be free from all weeds, roots, vegetable soil or other unstable materials and is to be filled in layers each of not more than 225 mm finished thickness.

L. Back Filling

Filling under floors, etc., shall be good hard stone ballast or quarry waste (or crusher run) or soft rock to the approval of the Engineer, broken to pass not greater than a 150mm ring or to be 75% of the finished thickness of the layers being compacted, whichever is the lesser. The fill material shall be free from all weeds, roots, vegetable soil, clay, black cotton soil or other unstable materials. It shall be well graded with smaller stones and fine materials to give a dense compact mass after consolidation. Sufficient fine materials shall be added to each layer to give gradation of material as necessary to obtain a solid compact mass after rolling. The fill material is to be laid in layers each of a consolidated thickness not exceeding 225mm. Each layer shall be compacted to at least a dry density of 95% MDD, to achieve this allow for at least a 10 tonne (static weight) vibrating roller. Sufficient water ie 80% to 105% of Optimum Moisture Content unless stated otherwise by the Engineer is to be added to obtain the stated minimum compaction.

The Contractor will be required perform sufficient numbers compaction tests in accordance with BS 1377:1975 on each layer and provide results to the Engineer for approval. In case of any doubt the Engineer may direct the contractor for further tests.

The top surface of the filling shall be leveled or graded to falls as required, and shall then be blinded with a layer of similar material broken to 25mm gauge and surfaced with a 25mm layer of stone dust, watered and consolidated by an 8 to 10 tonne smooth-wheeled roller. The surface so obtained shall be to the Engineer's approval.

M. Materials Found in Excavations

No sand, aggregate, murram or other material found in the excavations is to be used in the Works without the written permission of the Engineer.

N. Polythene Sheeting

Polythene sheeting shall be 1000 gauge and as approved. Joints in sheeting shall be treble folded with 150mm fold and taped at 300mm intervals with 50mm wide approved black plastic adhesive tape. The sheeting shall not be stretched but shall be laid loose with sufficient wrinkles to permit shrinkage up to 15%.

O. Cut Down Trees

The Contractor must consult the Engineer before cutting down or pruning any trees or shrubs encountered on the Site.

P. Notes Concerning Pricing and Measurement

The rates for excavation, including excavation in rock, MUST INCLUDE for trimming and preparing bottoms and all faces to receive concrete, and for any extra excavation required for planking and strutting.

Prices shall include for excavating in any material encountered unless specifically otherwise described, handling of extra bulk after excavating, or before consolidating, grubbing up any old drains, roots, etc., that may be encountered, trimming excavation or filling to embankments and batters, and carting away to spoil.

The Contractor shall allow and make provision for keeping the whole of the excavations thoroughly drained and clear of water below the lowest level of any part of the excavation for as long as may be required. The Contractor shall provide petrol or hand pumps or other mechanical appliances, pipes, chutes, dams, manholes, sumps, diversions or any other means necessary for that purpose. Water pumped from the trenches shall not be allowed to run down the road channels but shall be conveyed to the nearest surface water sewer, ditch or river through troughs, chutes or pipes.

CONCRETE WORK

A. Bending Schedules

The Engineer will issue bar bending schedules in accordance with B.S. 4466. The Contractor should check these against the Drawings before any cutting, bending or construction involving the schedules is started. Any discrepancy should be reported to the Engineer immediately for his clarification. The Contractor shall be responsible for any delays or additional work caused solely by his failure to check the schedules.

B. Code of Practice

All workmanship, materials, tests and performance in connection with the reinforced concrete work are to be in conformity with the latest edition of the British Standard (BS) Code of Practice (C.P) 8110 "The Structural Use of Concrete" where not inconsistent with this Specification.

C. Supervision & Inspection

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

The contractor shall give the Engineer at least 48hr notice to inspect any part of the work, this time shall be doubled if the site is more than 100 km from the nearest permanent office of the Engineer.

D. Contractor's Plant, Equipment and Construction Procedures

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

Where this Specification or the Drawings require specific procedures to be followed, such requirements are not to be construed as prohibiting use by the Contractor of alternative procedures if it can be demonstrated to the satisfaction of the Engineer that equal results will be obtained by the use of such alternatives.

Approval of plant and equipment or their operation, or of any construction procedure, shall not operate to waive or modify any provision or requirements contained in this Specification governing the quality of the materials or the finished work.

E. Tolerances

On all setting out dimensions of 5 metres and over a maximum non-accumulative tolerance of plus or minus 5 millimetres will be allowed. On all setting out dimensions under 5 metres a maximum non-accumulative tolerance of plus or minus 3 millimetres will be allowed. On the cross-sectional dimensions of structural members, unless otherwise required by the Drawings, a maximum tolerance of plus or minus 3 millimetres will be permitted.

The top surface of concrete floor slabs and beams shall be within 6 millimetres of the normal level and line shown on the Drawings. Columns shall be truly plumb and non-accumulative tolerance of 3 millimetres in each storey and not more than 15 millimetres out of plumb in their full height will be permitted. The Contractor shall be responsible for the cost of all corrective measures required by the Engineer to rectify work which is not constructed with the tolerances set out above.

F. Materials Generally

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

The sources of supply for all materials used for all concrete work shall be approved by the Engineer before these materials are delivered on the Site. All materials shall comply with the requirements of the latest appropriate British Standard unless otherwise agreed with the Engineer, whose approval shall be obtained in writing.

The suppliers of materials shall give the Engineer access to their premises when directed for the purpose of obtaining samples of the materials for testing.

G. Samples and Testing

Samples of materials shall be submitted as soon as possible after the Contract is let. No deliveries in bulk shall be made until the samples are approved by the Engineer. All condemned material shall be removed from the Site within 24 hours.

Every facility shall be provided to enable the Engineer to obtain samples and carry out tests on the materials and construction. If these tests show that any of the materials or construction do not comply with the requirements of this Specification, the Contractor will be responsible for the costs of the tests and the replacement of defective materials and/or construction.

H. Cement

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

Cement may be delivered to the Site either in bags or in bulk.

If delivered in bags, each bag shall be properly sealed and marked with the manufacturer's name and on the Site it is to be stored in a weather-proof shed of adequate dimensions with a raised floor. Each consignment shall be kept separate and marked so that it may be used in the sequence in which it is

received. Any bag found to contain cement which has set or partly set, shall be completely discarded and not used in the Works. Bags shall not be stored more than 1,500mm in height.

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

I. Aggregates

Aggregates shall conform with the requirements of B.S. EN 1260 and the sources and types of all aggregates are to be approved in all respects by the Engineer before work commences.

The grading of aggregates shall be one within the limits set out in B.S. EN 1260 and as later specified and the grading, once approved, shall be adhered to throughout the Works and not varied without the approval of the Engineer. Fine aggregate shall be clean, coarse, siliceous sand of good, sharp, hard quality and shall be free from lumps of stone, earth, loam, dust, salt, organic matter and any other deleterious substances. It shall be graded within the limits of Zone 1 or 2 of Table 2 of B.S. 882.

Coarse aggregate shall be good, hard, clean approved blacktrap or similar stone, free from dust, decomposed stone, clay, earthy matter, foreign substances or friable, thin, elongated or laminated pieces. It shall be graded within the limits of Table 1 of B.S. EN 1260 for its respective nominal size.

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

Aggregates shall be delivered to the Site in their prescribed sizes or gradings and shall be stockpiled on paved areas or boarded platforms in separate units to avoid intermixing. On no account shall aggregates be stockpiled on the ground.

J. Water

The water used for mixing concrete shall be from an approved source, clean, fresh and free from harmful matter, and comply with the requirements of B.S. EN 1008

K. Ready-Mixed Concrete

Ready-mixed concrete may only be used with the prior permission of the Engineer. Such permission will impose conditions and controls additional to this Specification to ensure that the quality of the concrete is to the specified standards.

L. Expansion Joints

Expansion joint filler shall be as manufactured by an approved manufacturer

M. Joint Sealer

Sealers shall be either hot or cold applied. Hot applied sealers shall comply with B.S. EN 14188. Cold mastic shall be applied by gun and where more than 12mm deep shall include filling with loose packing yarn to within 2mm from the outer face. All joint sealers are to be approved by the Engineer prior to their use.

N. Concrete Strengths

Concrete mixes shall have the following minimum strengths as given by Works Cube Tests:-

Minimum Crushing Strength:

	7 days N/mm ²	28 days N/mm ²
	-----	-----
<i>Class 40</i>	27	40

<i>Class 35</i>	24	35
<i>Class 30</i>	20	30
<i>Class 25</i>	17	25

The average strength obtained from cube tests shall be 10% higher than the minimum strengths shown above and shall otherwise conform to the requirements of BS 8110.

Works cube tests will not be required for Class 15 blinding concrete which shall comprise 1:3:6 nominal mix concrete by volume containing 0.10 cu. metres of fine aggregate and 0.20 cu. metres of coarse aggregate per 50 kg. bag of cement with 40mm maximum gauge of coarse aggregate.

O. Measured Proportions of Concrete

(a) Cement

The quantity of cement shall be measured by weight. Where delivered in bags, each batch of concrete is to use one or more whole bags of cement.

(b) Aggregates

For Class 40 to 25, concrete aggregates shall be measured by weight in a weigh-batching machine, as described hereafter.

For Class 15 concrete, aggregates may be measured by weight or by volume. Where by volume, approved gauge boxes of such a size as will give the correct proportions shall be used.

P. Weight-Batching Machines

Weigh-batching machines shall be of an approved type and shall be properly maintained and checked for accuracy at regular intervals.

Q. Concrete Classes 40 to 25

The weights of fine and coarse aggregate to be used in concrete Class 40 to 25 shall be limited in accordance with the table below. The proportions of fine to coarse aggregate and cement which the contractor proposes to use for each of the mixes specified shall first be approved by the Engineer. The Contractor will then be required to prepare Preliminary Test Cubes and have these cubes tested as described for Works Cube Tests. The test results shall be submitted to the Engineer in sufficient time for further tests to be carried out should they prove unsatisfactory. Cube strengths in the preliminary tests must show crushing strengths at least 25% higher than the strengths specified for Works Cube Tests. If the Contractor is unable to produce specified cube strengths, he will be required at his own cost to increase the cement content of the mix until satisfactory results are produced.

The Engineer may require at any time during the contract the proportions of fine to coarse aggregate to be altered in order to produce a mix of greater strength or improved workability and providing that the total proportions of aggregate to cement remain unchanged, no claim for additional cost will be considered.

R. Minimum Cement Content

Minimum Cement Content by weight to combined Concrete Class total weight of aggregate

Class 40	1 to 4.5
Class 35	1 to 5.0
Class 30	1 to 6.0
Class 25	1 to 7.0

S. Waterproof Concrete

Where waterproof concrete is specified, an approved water proofing additive and plastisizer are to be added to the mixing water strictly in accordance with the manufacturer's instructions unless otherwise

approved by the Engineer.

T. Waterbar

Waterbar shall be P.V.C. waterbar of an approved type and shall be provided in the positions indicated on the Drawings.

Joints shall be heat welded in accordance with the manufacturer's instructions and where the waterbar is to be fixed vertically, metal clips as manufactured by the supplier of the waterbar or of other approved design shall be provided to suspend the waterbar from the reinforcement at the spacing recommended by the manufacturer or as instructed by the Engineer.

Where waterproof concrete is used the Contractor shall adhere strictly to the position and type of construction joints as detailed on the Drawings. Any deviation from this procedure or the provision of additional construction joints will require the prior approval of the Engineer and any additional waterbar so required will be at the Contractor's expense.

Formwork shall be designed with sufficient timber formers and blocking pieces to support the waterbar and to ensure that it is not displaced during concreting. In the case of horizontal joints in vertical walling and similar members the formwork shall be so constructed as to permit the starter or up stand of concrete surrounding the lower half of the waterbar to be poured in the same operation as the slab or other concrete from which it springs. Formwork to walls or similar members where the waterbar is positioned at the base of the lift shall have sufficient openings not less than 300mm square at approximately 200mm above the level of the waterbar to permit checking that the waterbar is correctly positioned and not displaced during concreting.

No concreting will be permitted to portions where up stand starters form an integral part until the formwork to the starter has been fixed and approved.

U. Testing Equipment

The Contractor shall provide the following equipment for carrying out control tests on the Site:-

- (a) Straight edges 3 metres and 1 metre long for testing the accuracy of the finished concrete;
- (b) A glass graduated cylinder for use in the silt test for organic impurities in the sand;
- (c) Slump test apparatus;
- (d) Six 150mm steel cube moulds with base plates and tamping rods to B.S. 1881-24
- (e) An additional set of six cube moulds will be required at the site where pre-cast concrete is manufactured.

V. Works Cube Tests

Works cubes are to be made at intervals as required by the Engineer in accordance with BS 8110 and the test results shall provide a continuous record of the concrete work. The cubes shall be made in approved 150mm moulds in strict accordance with the Code of Practice. Three cubes shall be made on each occasion.

Each cube shall be marked with a distinguishing number (numbers) to run consecutively and the date, and a record shall be kept on site giving the following particulars:-

- (a) Cube No.
- (b) Date made
- (c) Location in Work
- (d) 7day Test Date Strength

(e) 28-day Test Date Strength

Cubes shall be forwarded, carriage paid, to an approved Testing Authority, in time to be tested, two at 7 days and the remaining one at the discretion of the Engineer. No cube shall be dispatched within 3 days of casting.

Copies of all Works Cube Tests shall be sent direct to the Engineer by the Testing Authority and one copy shall be retained on the Site.

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

W. Mixing and Placing of Concrete

The concrete shall be mixed only in approved power-driven mixers of a type and capacity suitable for the work, and in any event not smaller than 0.40/0.28 cu. metres capacity.

The mixer shall be equipped with an accurate water measuring device. All materials shall be thoroughly mixed dry before the water is added and the mixing of each batch shall continue for a period of not less than two minutes after the water has been added and until there is uniform distribution of the materials and the mass is uniform in colour.

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

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

As a check on concrete consistency slump tests may be carried out and shall be in accordance with B.S. 1881-24. The Contractor shall provide the necessary apparatus and carry out such tests as are required. The slump of the concrete made with the specified water content, using dry materials, shall be determined and the water to be added under wet conditions shall be so reduced as to give approximately the same slump.

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

Concrete shall be placed from a height not exceeding 1,500 mm directly into its permanent position and shall not be worked along the shutters to that position. Unless otherwise approved, concrete shall be placed in a single operation to the full thickness of slabs, beams and similar members, and shall be placed in horizontal layers not exceeding 1,500mm deep in walls and similar members.

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

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

Any accumulation of set concrete on the reinforcement shall be removed by wire brushing before further concrete is placed.

X. Mixing and Placing of Concrete (Ctd).

The Contractor shall provide runways for concreting to the satisfaction of the Engineer. Under no circumstances will runways be allowed to rest on the reinforcement.

Care shall be taken that the concrete is not disturbed or subjected to vibrations and shocks during the setting period.

Mixing machines, platforms and barrows shall be clean before commencing mixing and be cleaned on every cessation of work.

Where concrete is laid on hardcore or other absorbent materials, the base shall be suitably and sufficiently wetted before the concrete is deposited.

Y. Compaction

At all times during which concrete is being placed the Contractor shall provide adequate trained and experienced labour to ensure that the concrete is compacted in the forms to the satisfaction of the Engineer.

Concrete shall not be placed at a rate greater than will permit satisfactory compaction nor to a depth greater than 400 mm before it is compacted.

During and immediately after placing, the concrete shall be thoroughly compacted by means of continuously tamping, spading, slicing and mechanical vibration. Vibration is required for all concrete of Classes 40, 35, 30 and 25.

Care shall be taken to fill every part of the forms, to work the concrete under and around the reinforcement without displacing it and to avoid disturbing recently placed concrete which has begun to set.

Any water accumulating on the surface of newly placed concrete shall be removed and no further concrete shall be placed thereon until such water is removed.

Internal vibrators shall be of a frequency of not less than 7,000 cycles per minute and shall have a rotating eccentric weight of at least 0.50 kg., with an eccentricity of not more than 12 mm. Such vibrators shall visibly affect the concrete within a radius of 250 mm from the vibrator.

Internal vibrators shall not be inserted between layers of reinforcement less than one and one half times the diameter of the vibrators apart. Contact between vibrators and reinforcement and vibrators and formwork shall be avoided. Internal vibrators shall be inserted vertically into the concrete wherever possible at not more than 500 mm spacing and shall constantly be moved from place to place. No internal vibrator shall be permitted to remain in any one position for more than ten seconds and it shall be withdrawn very slowly from the concrete.

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

Vibrators shall not be used to move concrete from place to place in the formwork.

At least one internal vibrator shall be operated for every 1.5 cubic metres of concrete placed per hour and at least one spare vibrator shall be maintained on Site in case of breakdown during concreting operations. External formwork vibrators shall be of the high frequency low amplitude type applied with the principal direction of vibration in the horizontal plane. They shall be attached directly to the forms at not more than 1,200 mm centres.

In addition to internal and external vibration the upper surface of suspended floor slabs shall be levelled by tamping or vibrating to receive finishes. Vibrating elements shall be of the low frequency high amplitude type operating at a speed of not less than 3,000 r.p.m.

Z. Construction Joints

Construction joints shall be permitted only at the positions pre-determined on the Drawings or as instructed on the Site by the Engineer. In general they shall be perpendicular to the lines of principal stress and shall be located at points of minimum shear, viz., vertically at, or near, mid-spans of slabs, ribs and beams.

Suspended concrete slabs are generally to be cast using alternate bay construction in bays not exceeding 10 metres in length. No two adjacent bays are to be cast within a minimum period of 48 hours of each other. The joints between adjacent bays are to be in positions agreed with the Engineer.

'Shrinkage' bays, extending for the full width of the building at intervals of not less than 20 metres in the length of the building, are not to be cast until 7 days or more after casting the main adjoining floor areas.

Under no circumstances shall concrete be allowed to tail off, but it shall be deposited against stopping-off boards. Where specified the 25mm deep by 3mm wide PVC/hardwood strip shall be held on the inside face of the stopping-off boards by means of 18g binding wire at 300mm centres such that when the stopping-off board's removed the strip remains bound to concrete.

Before placing new concrete against concrete already hardened, the face of the old concrete shall be thoroughly hacked, roughened and cleaned and laitance and loose material removed therefrom, and immediately before placing the new concrete the surface shall be saturated with water. Where the top surface of the concrete is the final finished surface eg power float every care shall be taken that the surface is not damaged while roughening the sides.

AA. Curing and Protection

Care must be taken that no concrete is allowed to become prematurely dry and the fresh concrete must be carefully protected within two hours of placing from rain, sun and wind by means of hessian sacking, polythene sheeting, or other approved means.

This protective layer and the concrete itself must be kept continuously wet for at least seven days after the concrete has been placed. The Contractor will be required to provide complete coverage of all fresh concrete for a period of 7 days. Hessian or polythene sheeting shall be in the maximum width obtainable and shall be secured against wind. The Contractor will not be permitted to use old cement bags, hessian or other material in small pieces.

Concrete in foundations and other underground work shall be protected from admixture with falling earth during and after placing.

Traffic or loading must not be allowed on the concrete until the concrete is sufficiently matured, and in no case shall traffic or loading be of such magnitude as to cause deflection or other movement in the formwork or damage to the concrete members. Where directed by the Engineer props may be required to be left in position under slabs and other members for greater periods than those specified hereafter.

BB. Faulty Concrete

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

CC. Rod Reinforcement

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

Hot rolled bars for the reinforcement of concrete to B.S. 4449 (Metric units) Cold

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

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

DD. Fabric Reinforcement

To be electrically cross-welded steel wire mesh reinforcement to B.S. 4483 and of the size and weight specified.

EE. Fixing Rod Reinforcement

Reinforcement shall be accurately bent to the shapes and dimensions shown on the Drawings and Schedules and in accordance with B.S. 8666. Reinforcement must be cut and bent cold and no welded joints will be permitted unless so detailed.

Reinforcement shall be accurately placed in position as shown on the Drawings, and before and during concreting shall be secured against displacement by using No. 18 S.W.G. annealed binding wire or suitable clips at intersections, and shall be supported by concrete or metal supports, spacers or metal hangers to ensure the correct position and cover.

No concreting shall be commenced until the Engineer has inspected the reinforcement in position and until his approval has been obtained and the Contractor shall give two clear days notice of his intention to concrete.

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

FF. Position and Correctness of Reinforcement

Irrespective of whether any inspection and/or approval of the fixing of the reinforcement has been carried out as above, it shall be the Contractor's sole responsibility to ensure that the reinforcement complies with the details on the Drawings or Schedules and is fixed exactly in the positions shown therein and in the positions to give the prescribed cover. The Contractor will be held entirely responsible for any failure or defect in any portion of the reinforced concrete structure and including any consequent delay, claims, third party claims, etc., where it is shown that the reinforcement has not been correctly positioned or is incorrect in size or quantity with respect to the detailed Drawings or Schedules.

GG. Spacer Blocks

Spacer blocks of approved size and shape made of concrete similar to that used in the surrounding construction and fixed to the reinforcement or formwork by No. 18 S.W.G. wires set into the spacer blocks or other approved means shall be provided where necessary to ensure that the requisite cover is obtained.

HH. Concrete Cover to Reinforcement

Unless otherwise directed the concrete cover to rod reinforcement over main bars in any face shall be:-

Foundations against earth face 75 mm

Foundations against blinding 50 mm

Columns 40 mm

Beams	25 mm
Slabs	15 mm

II. Fixing Fabric Reinforcement

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

JJ. Projecting Reinforcement

Where reinforcement projects from a concreted section of the structure and this reinforcement is expected to remain exposed for some time, it is to be coated with a cement grout to prevent rust staining on the finished concrete. This grout is to be brushed off the reinforcement prior to the continuation of concreting.

KK. Fixtures

No openings, chases, holes or other voids shall be formed in the concrete without the prior approval of the Engineer. Details of any fixtures to be permanently built into the concrete including the proposed position shall be submitted to the Engineer for his approval before being placed all electrical conduits 25mm and over in diameter.

LL. Chases, Holes, etc., in Concrete

The Contractor shall be responsible for the co-ordination with the Sub-Contractors for incorporating various items e.g. structural steel plates/bolts, electrical conduit, pipes, fixing blocks, chases, holes, and the like in concrete members as required and must ensure that adequate notice is given to such Sub-Contractors informing them when concrete members incorporating the above are to be poured. The Contractor shall submit full details of these items to the Engineer for approval before the work is put in hand. All fixing blocks, chases, holes, etc., to be left in the concrete shall be accurately set out and cast with the concrete. **Note the setting out of such items will be carried out by the sub- contractor and the main contractor shall be responsible for ensuring that the item remains in position while concreting.**

MM. Position of Electrical Conduits

Unless otherwise instructed by the Engineer all electrical conduits to be positioned within the reinforced concrete shall be fixed inside the steel cages of beams and columns and between the top and bottom steel layers in slabs and similar members.

The proposed position of all electrical conduits 25mm and over in diameter which are to be enclosed in the concrete shall be shown accurately on a plan to be submitted to the Engineer, whose approval shall be obtained before any such conduit is placed.

NN. Formwork

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

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

OO. Construction of Formwork

All formwork shall be of sufficient thickness and with joints close enough to prevent undue leakage of liquid from the concrete and fixed to proper alignment, level and plumb and supported on sufficiently strong bearers, shores, braces, plates, etc., properly held together by bolts or other fastenings to prevent

displacement, vibration or movement by the weight of materials, men and plant on same and so wedged and clamped as to permit of easing and removal of the formwork without jarring the concrete. Where formwork is supported on previously constructed portions of the reinforced concrete structural frame, the Contractor shall, by consultation with the Engineer, ensure that the supporting concrete structure is capable of carrying the load and/or sufficiently propped from lower floors or portions of the frame to permit the load to be temporarily carried during construction.

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

Great care shall be taken to make and maintain all joints in the formwork as tight as possible to prevent the leakage of grout during vibration. All faulty joints shall be caulked to the Engineer's approval before concreting.

The formwork shall be sufficiently rigid to ensure that distortion or bulging occurs under the effects of vibration. If at any time the formwork is insufficiently rigid or in any way defective the Contractor shall strengthen or improve such formwork as the Engineer may direct.

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

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

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

PP. Stripping Formwork

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

Beam sides, walls and columns (unloaded)	3 days
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Slab soffits (props left under)	7 days
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Beam soffits (props left under)	9 days
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Removal of props (partly subject to concrete cube strength being satisfactory) to:

Slabs	21 days
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Beams	21 days
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If the Contractor wishes to take advantage of the shorter stripping times permitted for beam and slab soffits when props are left in place, he must so design his formwork that sufficient props as agreed with the Engineer can remain in their original positions without being moved in any way until expire of the minimum time for removal of props. Stripping and re-propping will not be permitted.

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

QQ. Supporting Props to Wall and Beam Soffits

Where directed by the Engineer supporting props to slab and beam soffits are to be left in position until completion of the whole of the reinforced concrete structure.

The props are to be to the approval of the Engineer and the Contractor must submit the suggested method of propping to the Engineer prior to removal of formwork to the relevant surfaces.

RR. Exposed Concrete Finishes

(a) General

The Contractor will be required, at an early stage in the Contract, to prepare samples for the approval of the Engineer of the various concrete finishes specified hereafter. Samples are to be prepared using the same materials and the same methods of construction, compaction, curing, etc., as the Contractor proposes to use for executing the full quantity of the work.

A record of the mix, water content, method of compaction, any additives used, etc., is to be kept for each sample prepared. When the Engineer has approved a sample it will be kept on Site in approved location. The finishes in construction will be expected to be up to a standard equal to the approved sample. The Contractor is to include for all costs in preparing samples in his rates for the respective finish.

Consistency in cement and colour, grading and quality of aggregates must be maintained in all finished concrete work.

(b) Tamped Finish

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

(c) Chamfers and Rebates to Exposed Concrete

Where concrete surfaces are to remain exposed and otherwise where specified or shown on the Drawings, rebates and chamfers are to be provided at junctions, corners, and changes in direction of concrete members.

Rebates will also be required to surrounds to chisel-dressed, brushed, or similar concrete finishes.

Rebates and chamfers are to have a fair face finish.

Unless otherwise instructed, concrete pours to columns and to other members where applicable are to terminate only at the pre-determined rebate positions.

(d) Fair Face

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

(e) Chisel Dressed Finish

Chisel-dressed finish may be carried out on any grade of concrete but not until it is at least 30 days old.

The surfaces are to be fully chisel-dressed to remove a maximum of 15mm (average 9mm) of the surface by shearing and exposing the aggregate without excessive cracking of the surrounding

matrix.

Arises of columns, beams, etc., are pre-formed fair face with timber set in the formwork and care must be taken in working up to these to preserve a clean line.

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

All surfaces requiring this treatment are to have the margins chisel-dressed by hand for a minimum width of 75mm commencing from the fillet edge. Thereafter mechanical chisel- dressing may be used but the Contractor must ensure that a uniform texture and even plane surface is achieved.

The use of sharply pointed steel tools for both hand and mechanical chisel-dressing is essential. Upon completion the surfaces are to be thoroughly wire brushed and washed down.

SS. Protection of Finishes

Wherever possible, in-situ exposed concrete finishes should be commenced at the highest level and worked progressively down the building.

Precautions shall be taken to avoid staining or discolouring of previously finished concrete faces by leakage of grout from newly placed concrete. The Contractor shall during all stages of construction adequately protect all concrete finishes from damage by leaking grout, knocking, paint stains, falling plaster, etc. In cases of balustrade walls to staircases and members where damage is otherwise likely, concrete finishes shall be protected by cladding with timber, softboard, or other approved sheeting. All Sub-Contractors shall be informed accordingly on the precautions to be taken.

TT. Joggle Joints

Construction joints in basement walls and where specified elsewhere are to be joggle joints to the dimensions shown on the Drawings, unless directed otherwise by the Engineer.

Before pouring concrete to the adjoining areas beyond the joint, the flat surfaces on each side of the recess are to be thoroughly hacked to remove all laitance and loose concrete and washed with water. Before formwork on the second side is placed, a layer of bitumen Type 7, 30 to 40 mm thick is to be applied by trowel to the faces of the recess. This bitumen layer is to be protected by a covering strip of 1000 gauge polythene which is to be removed immediately before pouring concrete. At horizontal joints a layer of cement/sand grout 50 mm thick and of the same proportion as the cement and sand in the surrounding concrete is to be applied to the joint surface immediately before pouring concrete.

UU. Precast Concrete

All materials (including fixings), workmanship, production, transport, storage, handling, erection methods and protection from damage shall comply with B.S. C.P. 110, except where inconsistent with this Specification.

Should the Contractor wish to make greater use of precast concrete construction either in the main structural frame or in cladding units than the present design permits, he may propose alternative forms of construction which will be given due consideration by the Engineer.

Finishes generally shall be as already described.

Where production of precast concrete units is to be carried out elsewhere than the main building site, the precasting yard shall be considered as part of the main building site in as far as this Specification is concerned.

The maximum size of coarse aggregate in precast concrete shall not exceed 20mm except for thicknesses less than 75 mm where it shall not exceed 10mm.

The compacting of precast concrete shall conform with requirements given elsewhere in this Specification except for thin slabs where use of immersion type vibrators is not practicable. The concrete in these slabs may be consolidated on a vibrating table or by any other methods approved by the Engineer.

Steam curing of precast concrete will be permitted. The procedure for steam curing shall be subject to the approval of the Engineer.

The precast work shall be made under cover and shall remain under the same for seven days. During this period and for a further seven days the concrete shall be shielded by sacking or other approved material kept constantly wet. It shall then be stacked in the open for at least a further seven days to season before being set in position. Where steam curing is used these times may be reduced subject to the approval of the Engineer.

Precast concrete units shall be constructed in individual forms. The method of handling the precast concrete units after casting, during curing and during transport and erection shall be subject to the approval of the Engineer, providing that such approval shall not relieve the Contractor of responsibility for damage to precast concrete units resulting from careless handling.

Repair of damage to the precast concrete units, except for minor abrasions of the edges which will not impair the installation and/or appearance of the units, will not be permitted and the damaged units shall be replaced by the Contractor at his own expense.

Except where precast work is described as "fair face" the moulds shall be made of suitably strong sawn timber true in form to the shapes required. Unless otherwise described faces are to be left rough from the sawn moulds.

Where precast work is described as fair face the moulds are to be made of metal or are to have metal or plywood linings or are to be other approved moulds which will produce a smooth dense fair face to the finished concrete suitable to receive a painted finish direct and free from all shutter marks, holes, pitting, etc.

The precast units shall be installed to the lines, gradients and dimensions shown on the Drawings or as directed by the Engineer.

VV. Concrete Surface Beds

The concrete shall be placed as soon as possible after being mixed. In transporting the concrete adequate precautions shall be taken to avoid damage to the prepared base. The concrete shall be spread to such a thickness that when compacted it shall have the finished thickness as specified or shown on the Drawings. A layer of concrete 50 mm (or as specified on the drawing) less than the finished thickness shall first be spread and struck off at the correct level to receive the top fabric reinforcement. The top layer shall then be added. Not more than 30 minutes shall elapse between spreading the bottom layer and the start of compaction of the top layer.

The Contractor must ensure that the reinforcement is held rigidly in position to provide the required cover shown on the drawings. A system of stools/chairs formed with 12mm ms rod placed on a grid of 1m x 1m on leveled concrete pads shall be acceptable to hold the reinforcement in place.

The compacting and finishing of the concrete shall be effected by immersion vibrators and a hand or mechanical tamper weighing not less than 10 kg. per linear metre and having a tamping edge with a steel strip 75 mm wide fixed to the tamper by countersunk screws. Immersion vibrators with "spade" attachments will be permitted. Compaction shall be continued until a dense, scaled surface finish is achieved. Over-compaction causing an excessive amount of fines to be brought to the surface shall be avoided.

The surfaces of the concrete shall be finished to a wood float finish or as otherwise directed to the levels, falls and cross falls as directed or shown on the Drawings and shall be subject to the following tolerances:-

1. The level shall be within + or - 6 mm of the levels directed.

2. The falls shall be within 10% of the falls directed.
3. The smoothness shall be such that departures from a 3 metre straight edge laid in any direction shall not exceed 3mm.

Minor irregularities shall be made good by the use of a steel float but in no circumstances shall mortar be used to make good the surface.

Where specified, before the concrete has finally set and after completion of the floating the concrete shall be brushed with a strong headed broom to produce a grooved finish in parallel lines to the satisfaction of the Engineer. As soon as the surface has been finished it shall be protected against too-rapid drying by means of damp hessian, polythene sheeting or other approved means placed carefully on the surface and kept damp and in position for 7 days and the concrete shall be kept wet for a further 21 days. The most critical period is the first 24 hours after placing and the curing during that time shall be very thorough. The Contractor is to obtain the Engineer's approval to the material and method he proposes to use for curing and no concreting will be permitted until sufficient such material is on Site.

Forms shall not be removed from freshly placed concrete until it is at least 24 hours old. Care shall be taken that in their removal no damage is done to the concrete, but should any damage occur the Contractor shall be responsible for making it good.

Where the surface bed is specified to be cast in panels, these shall in NO circumstances exceed 36 sq. metres in area and no dimension shall exceed 6 metres. The slabs shall be cast in chequer-board fashion.

Slabs for vehicular traffic, finished "off the beam" shall be solidly laid and tamped with a beam 50 mm wide with the lines of the beam to the top surface of slab diagonal to any fall.

Brushed concrete surface, where specified, shall be achieved by the following operation. While still green, the concrete is to have dry cement and sand (1:3) sprinkled on and the surface dragged with a coarse broom adding water as necessary and as directed by the Engineer. All rates must include this type of finish.

WW. 50 mm Thick Topping in Concrete Slab

The topping concrete which shall not be less than 50mm thick shall consist of the following mix: 1 x

50kg bag Ordinary Portland Cement

75kg washed river sand, complying with B.S. EN 12620.

150kg washed 12mm (1/2") maximum size aggregate of approved grading and of spherical shape.

Application of plasticiser to be carried out in accordance with the manufacturers specifications and to the Engineers approval. The dosage of the additive shall be to the Engineer's approval

20 litres of clean water to be adjusted as necessary by the Engineer to allow for the water content in the aggregates, but to be the minimum necessary to achieve workability.

The surface should be further treated with a hardener and approved dust proofing agent to manufacturers specification where specified to the Engineers approval. The dosage of the hardener shall be to the Engineer's approval

The screed shall be compacted by tamping and the surface finish shall be formed with a steel float to give a smooth even level surface. Trowelling shall be the absolute minimum to achieve this and any overworking of the surface shall be avoided.

At joints the top 12mm of hardboard including the timber fillets shall be out after 21 days from the pouring, and the groove filled with "mastic" sealant or an alternative approved by the Engineer. The level of the top of the sealer shall be proud of the concrete surface by approximately 3mm.

XX. Power Float Concreting

The procedure is as described under **item 2.52** above except use mechanical/power operated steel float instead of wood or hand steel float to manufacturer's specification and to the approval of the Engineer.

YY. Saw Cuts in the Topping

Where saw cuts are specified to form construction joints these shall be carried out within 3-days (or as directed by the Engineer) of pouring concrete. The saw cuts shall be formed using power disc saw at locations shown on the drawings and the distance between the saw-cuts shall not be more 6.0m in either direction. The cuts shall be minimum 25mm deep and filled with approved industrial grade mastic sealant.

ZZ. Notes Concerning Pricing

The Contractor must allow for all costs incurred during the progress of the Contract for complying with the provisions concerning the preparation and use of graded mixes.

Prices for plain or reinforced concrete shall include for mixing, hoisting, depositing, compacting, curing and protection at the various levels required throughout the building, and shall also include for forming or hacking a satisfactory key for all faces receiving asphalt and plaster work. Prices for slabs shall include for forming construction joints at bay edges, including all necessary temporary formwork and supplying records of such joints to the Engineer.

Prices for steel rod reinforcement shall include for cutting to lengths and all labour in bending and cranking, forming hooked ends, handling, hoisting and fixing in position and for providing all necessary tying wire, spacer blocks and supports. Prices for fabric reinforcement shall include for all straight cutting and waste, handling hoisting and fixing in position, providing all necessary tying wire, and supports and all extra material in laps. The prices for formwork shall include for extra material at joints, extra labour and waste for narrow widths, small quantities, overlaps, passings at angles, straight cutting and waste, splayed edges, notchings, etc., and for fixing at the various levels including battens, struts, and supports and for bolting, wedging, easing, striking and removal. Prices for linear items such as boxings shall include for angles and ends.

Prices of all precast concrete shall include for all moulds, finishings, as described, handling, reinforcement, hoisting and fixing at the required levels and for casting or cutting to the exact lengths required and any waste resulting from such cutting.

Prices for expansion joints shall include for cutting to size and all temporary supports and prices for expansion joint sealers shall include for all temporary battens or fillets required to form the necessary grooves.

The price for wrought formwork shall include for fair face finish either by rubbing down or by smooth lining, all as described in this Specification.

WALLING

A. Setting Out

The Contractor shall provide all necessary equipment and materials to accurately set out and shown the proper positions and levels of all openings, apertures, sills and lintels and shall build the various foundations, piers, walls, etc., to the correct thickness, widths, heights and other dimensions shown on the Drawings. Accurate setting out to approved methods will also apply in respect of other sundry works. The Contractor should include for all setting out and building to correct dimensions as shown on the Drawings or otherwise instructed by the Engineer in his rates quoted for building and other sundry work items.

B. Cement

The cement shall be as described in "Concrete Work"

C. Sand

The sand for mortars shall conform to B.S. EN 13139.

D. Lime

The lime shall be as described under "Plasterwork"

E. Mortars

Cement mortar shall consist of one part of cement to four parts of sand by volume.

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

The ingredients of mortar shall be measured in proper gauge boxes on a boarded platform, the ingredients being thoroughly mixed dry, and again whilst adding water. In the case of cement/lime mortar, the sand and lime shall be mixed first and then the cement added. All mortar is to be thoroughly mixed to a uniform consistency with only sufficient water to obtain a plastic condition suitable for trowelling. No mortar that has commenced to set is to be used or remixed for use.

F. Concrete Blockwork

Concrete blocks shall be hollow or solid complying with B.S. EN 771-3 Type 'A', of minimum crushing strength 3.5 N/mm², unless shown otherwise, and must be obtained from an approved manufacturer, equal to samples deposited with and approved by the Engineer.

All concrete blocks must be cured for a minimum period of four weeks before use and all testing of blocks is to be carried out by an approved Materials Testing Laboratory or other approved laboratory and shall be at the Contractor's expense.

All blocks shall be handled and stacked with care. The blocks shall be stacked protected from rain by a cover and in such a way that air circulates around them. No broken block or block of improper quality shall be used.

All blockwork shall be bonded, pointed and uniformly bedded in true horizontal course in cement mortar and built true to line and profile. Blockwork shall be carried up evenly and in regular stages and no part shall be raised more than 1 metre above any other part of the work at any time. All blocks shall be well soaked before use and the top of unfinished walls wetted and raked back before work is recommenced. All blockwork shall be built with vertical joints staggered such that no joint in any one course shall be within 112 mm of a similar joint in the course immediately above or below.

All perpend, reveals, quoins and other angles and joints of the walls etc., shall be built strictly true and square.

Blockwork which is not to be rendered shall be finished with a fair face and the blocks shall be selected for even texture and unmarked faces, regular shape and square, unbroken arises. The blockwork shall be pointed as the work proceeds with a neat joint as required by the Engineer's Representative. Where blockwork is to be rendered the joint shall be raked out 12 mm deep as the work proceeds to form an adequate key. Blockwork shall be bonded to concrete columns and walls including portal frame legs by approved galvanised metal ties cast into the concrete, spaced at alternate courses and extending not less than 150 mm into the block joints.

Chases shall be cut as necessary for services but no excessive cutting will be permitted. Chases shall be made good after the erection of services by building in pieces of block or mortar.

G. Stone Walling

Stone for walling, piers, stacks, etc., throughout shall be obtained from a quarry approved by the Engineer and shall be free of soft or decomposed matter, fractures and other defects. It shall be laid on its natural bed, properly lapped and bonded. All stone work shall be thoroughly wetted before laying and walling shall be thoroughly wetted after laying for at least 3 (three) days.

H. Wall Reinforcement

70, 90 and 140 mm Stone and concrete block walls are to be reinforced with long lengths of 20 mm wide hoop iron x 20 gauge which is to be lapped and hooked at joints, one strand to alternate courses. In the event that hoop iron is not available, then 8 gauge high strain fencing wire may be used, one strand to 70 and 90 mm walls and 2 strands to 140 mm walls.

I. Damp-proof Courses

Damp-proof courses shall be bituminous felt to B.S. 8215 weighting 3.85 kg. per square meter, free from tears and holes and be laid with 150 mm minimum laps on and including a leveling screed of cement mortar.

J. Water Proofing Membrane

Water proofing membrane where specified shall be applied as per the Manufacturers specification. The Contractor shall be required to provide a certificate of compliance to the specification necessary and guarantee from the manufacturers or approved dealers.

K. Prices to Include

The prices for walling shall include for all reinforcement, straight cutting, bonding, plumbing angles, forming reveals, pinning up to under side of concrete soffits and cutting up to sides columns and pinning ends of lintels and sills.

ROOFING

A. General

Tiles shall be supplied by an approved firm. Samples of tiles must be submitted and the Engineer's written approval obtained before work is commenced.

B. Roofing Sheets and Accessories

Roofing sheets shall be 24 gauge roof sheets or other equal and approved. The roof sheets shall comply with the relevant Kenya Bureau of Standards (KBS) code for roof sheets. The accessories (ridge/hip caps, flashings etc) shall all match the roof sheets in thickness, colour, profiles etc. The sheets and accessories shall all be fixed in accordance with the Manufacturer's printed instructions and Engineer's satisfaction.

C. Tiling Battens

Tiling battens shall be of the timber as specified for carpentry treated with wood preservative and complying with B.S. 5534.

D. Workmanship

Tiles shall be properly stacked on wood strips and straw on level ground. Tiling shall be close joined with the horizontal and vertical joints ranging perfectly straight. Each course shall be laid flat on the previous course and properly bonded.

E. Staining

Staining of the roof when fixing ridges and hips or by other operation under the Contract must be avoided. Allow for protecting the roof with tarpaulins and polythene sheeting as necessary and for removing such

stains or replacing affected work as directed on completion.

CARPENTRY

A. All Timber

All timber shall be in accordance with the latest approved Grading Rules issued by the Government of the Republic of Kenya. Timber for Carpentry shall be SECOND (OR SELECT) GRADE and timber for joinery shall be FIRST (OR PRIME) GRADE.

B. Generally

All timber as it arrives on the Site shall be inspected by the Contractor and any timber brought on the Site and not complying with the Specification or not approved, must be removed forthwith from the Site and only timber as approved shall be used in the Works.

The Contractor shall upon signing the Contract purchase sufficient supplies of specified softwoods to avoid possible shortages at a later date.

C. Species of Timber

The following timber shall be used as later described

<u>Standard Common Name</u>	<u>Botanical Name</u>
Cypress - from plantation forests (preferably Forest Standard-ship Certificate (FSI))	Cypressus

D. Tolerances in Thickness

Shall conform with the following extracts of Government of Kenya Grading Rules: -

(1) Hardwood Grading (First and Second Grades)

The following tolerances in thickness will be admitted: -

- (a) 1.5mm oversize on pieces up to 25mm in thickness
- (b) 3mm oversize on pieces over 25mm and up to 50mm in thickness.
- (c) 6mm oversize on pieces over 50mm in thickness.

Undersize timber will not be permitted.

(2) Softwood Grading: Strength Grades (for Carpentry)

First and Second Grades.

Undersize not allowed.

Oversize: All timber to be sawn oversize by 1.5mm per 25mm of thickness and width to a maximum of 3mm in thickness and 6mm in width.

(3) Softwood Grading: Appearance Grades (for Joinery)

First and Second Grades.

All as for Strength Grades above.

E. Insect Damage

All timber shall be free from live borer beetles or other insect attack when brought upon the Site. The Contractor shall be responsible up to the end of the maintenance period for executing at his own cost all work necessary to eradicate insect attack to timber which becomes evident, including the replacement of timber attacked or suspected of being attacked, notwithstanding that the timber concerned may have already been inspected and passed as fit for use.

F. Seasoning of Timber

All timber shall be seasoned to a moisture content of not more than 22% for Carpentry and 15% for Joinery.

G. Pressure Impregnation Treatment

All Carpentry timbers, sawn joinery and timber grounds for fixing joinery shall be treated with pressure impregnated treatment solution with a minimum nett retention of 0.35 lbs. of dry salt per cubic foot. If so required “charge sheets” issued after treatment shall be submitted by the Contractor to the Engineer for his retention. All cut ends and any other cut faces of timbers sawn after treatment shall be treated before fixing with treatment solution brushed on.

The Contractor’s prices for such timber hereinafter must allow for the above treatment.

H. Inspection and Testing

The Engineer shall be given facilities for inspection of all works in progress whether in workshop or on Site. The Contractor is to allow for testing of prototypes of special construction units and the Engineer shall be at liberty to select any samples he may require for the purpose of testing, i.e. for moisture content, or identification, species, strength, etc.; such tests will be carried out by an approved Testing Laboratory.

I. Clearing Up

The Contractor is to clear out and destroy or remove all cut ends, shavings and other wood waste from all parts of the building and the Site generally, as the work progresses and at the conclusion of the work.

This is to prevent accidental borer infestation and to discourage termites and decay.

J. Workmanship

All Carpenter’s 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 necessary, directed and approved, and the Contractor’s prices shall allow for all the foregoing.

All workmanship shall be of the best quality.

All Carpenter’s work shall be left with sawn surfaces except where particularly specified to be wrought.

K. Dimensions

Dimensions of timber for Carpentry left with sawn faces shall comply with the previous Clause specifying tolerances in thickness. Dimensions for wrought members shall be as described in “Joinery”.

L. Jointing

All timber shall be as long as possible and practicable to eliminate joints. Where joints are unavoidable surfaces shall be in contact over the whole area of the joint before fastenings are applied.

No nails, screws, or bolts are to be fixed in any split end. If splitting is likely, or is encountered in the course

of any work, holes for nails are to be prebored at diameters not exceeding $\frac{4}{5}$ 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 is to be taken to avoid crushing of the timber under the washers.

JOINERY

A. All Timber

All timber shall be FIRST (OR PRIME) Grade. Species of timber and tolerance shall be defined under “Carpentry”.

B. General

All joiner’s work shall be accurately set out on boards to full size for the information and guidance of the artisans before commencing the respective works, with all joints, iron work and other works connected therewith fully delineated. Such setting out must be submitted to the Engineer and approved before such respective works are commenced.

All joiner’s work shall be cut out and framed together as soon after the commencement of the building as is practicable, but not to be wedged up or glued until the building is ready for fixing same. Any portions that warp, wind or develop shekes or other defects within six months after completion of the works shall be removed and new fixed in their place together with all other work which may be affected thereby, all at the Contractor’s own expense.

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

Joints in joinery must be as specified or detailed, and so designed and secured as to resist or compensate for any stresses to which they may be subjected. All nails, springs, etc., are to be punched and puttied. Loose joints are to be made where provision must be made for shrinkage, glued joints where shrinkage need not to be considered and where sealed joints are required. Glued for load bearing joints or where conditions may be guaranteed casein or organic glues may be used.

All exposed surfaces of joinery work shall be wrought and all arrises “eased off” by planing and sand-papering to an approved finish suitable to the specified treatment.

C. Insect Damage

All timber shall be free of insect damage as defined under “Carpentry”.

D. Seasoning of Timber

All timber shall be seasoned to a moisture content of not more than 15%

E. Dimensions

3mm Reduction off specified sizes will be allowed to each wrought face except where described as finished sizes in which joinery shall hold up to the full dimensions.

The Contractor is to note that all joinery timber sizes are normal unless otherwise stated as finished sizes. These nominal sizes have been calculated in accordance with Standard Method of Measurement of Building Works, January 1987 2nd Edition Metric and no regard has been taken of metric sizes of timber at present being sold.

F. Fixing Joinery

All beads, fillets and small members shall be fixed with round or oval brads or nails well punched in and

stopped. All larger members shall be fixed with screws. Brass screws shall be used for fixing of all timber, the heads let in and pelleted over with wood pellets to match the grain.

G. Bedding Frames etc.

The Contractor's rates must include for bedding frames, sills etc., in mortar or dressing surfaces of walls, etc., in lieu.

H. Plugging Concrete and Walls

Round wood plugs shall not be used. All work described as plugged shall be fixed with screws to plugs formed by drilling concrete walls etc. With a proper tool of suitable size at 750mm spacing and filling the holes completely with approved rawl plastic or Rawplugs in accordance with the Manufacturer's instructions. Alternatively and where so agreed by the Engineer hardwood dovetailed fixing slips, dipped in approved treatment solution and cut and pinned or bedded in cement mortar (1:3) may be used.

I. Fibreboard: Shall be 12mm termite-proofed softboard cut to panels with V-edges.

J. Plywood: Shall comply with B.S. 6566 (First Quality "interior type" unless otherwise specified).

K. Blockboard: Shall be laminated board faced both sides with 4mm plywood. Exposed edges shall be lipped with 20mm softwood and rates shall include for lipping.

L. Plastic Sheetting: Shall be "Formica" sheeting 1/16" thick and securely fixed with approved type waterproof adhesive and in the colours approved by the Engineer.

M. Chipboard: Shall be resin bonded and shall comply with B.S. EN 312.

N. Protect Joinery

Any fixed joinery which in the opinion of the Engineer is liable to become bruised or damaged in any way, shall be completely cased and protected by the Contractor until the completion of the Works.

O. Flush Doors

All flush doors shall be manufactured to the thickness specified and consist of 100mm wide framing all round with horizontal core battens at not more than 75mm centres pressure impregnated as described and bored with 12mm diameter ventilation holes at 300mm centres. Doors shall have two lock blocks and be faced both sides with approved veneer and have 25mm softwood rebated lipping all round and otherwise be equal to an approved sample. External flush doors shall be as described above but faced both sides with "exterior" quality plywood. Doors should also receive stiffening/blocking for UNON- PACT Access Control System Electronic Locking System.

P. Prices to Include

Prices of items hereafter shall include for the foregoing labours etc., and in addition all prices for linear items are to include all internal and external angles, either mitred or tongued all fair, fitted, stopped, notched or returned ends all similar incidental labours and all short lengths.

Q. Bottom Edges

Bottom edges of doors shall be painted with one coat of approved primer before fixing.

R. Ironmongery

All locks and ironmongery shall be fixed with screws etc. to match. Before the woodwork is painted, handles shall be removed carefully stored and re-fixed after completion of painting and locks oiled and left in perfect working order. All keys shall be labelled with the door reference marked on labels before handing to the Engineer on completion.

UNON-PACT Access Control Locking & Electronic Card Readers shall be fixed by UNON Specialist

Contractor to conduited & cabled outlets provided under this Contract to Specialist Contractor's layout and requirements. Provide attendance on specialist installers.

METAL WORK

A. All Materials

Shall be of the best quality, free from defects. The materials in all stages of transportation, handling and piling shall be kept clean and injury from breaking, bending and distortion prevented.

B. Nails, Screws and Bolts

Shall be of the best quality mild steel of lengths and weights approved by the Engineer. Nails shall be to B.S. 1202-1 and bolts to B.S. 916.

C. Workmanship

All work shall be carried out in the most workmanlike manner and strictly as directed by the Engineer.

Welding shall be neatly cleaned off and units shall be prefabricated in the workshop wherever possible, the minimum of site welding being employed.

All screwed work shall have full internal and external threads and holes shall have been cleaned off. Counter sinkings must be concentric.

D. Rainwater Goods

Prices shall include for building in, casting in or cutting mortices for fastenings, all making good, jointing, short lengths and all extra joints in the case of fittings.

E. Louvre Clips

Shall be approved of steel, aluminium-lacquered, single control type, unless otherwise described, carefully screwed into timber sub-frames or plugged and screwed to walling.

Prices shall include for oiling and adjusting and leaving clean and undamaged on completion.

F. Fixing Metal Windows

The Contractor's prices for fixing metal windows, doors etc. shall include for assembling and fixing, cutting mortices for lugs in concrete or walling and running with cement mortar (1:4), bedding frames in similar mortar and pointing in mastic, bedding cills, transomes and mullions in mastic, making good plaster around frames both sides and fixing, oiling and adjusting all fittings.

G. Mild Steel

For balustrades etc. shall comply with B.S. 15 No work shall be fabricated until site dimensions have been checked and no additional claim will be accepted should final dimensions differ from those on the drawings. All welds shall be ground smooth and the Contractor shall ensure that the metalwork is prepared for painting as described in painting and decorating.

The Contractor is to ensure that all work is erected plumb and true and be so maintained until properly secured by permanent fixings.

H. Structural Hollow Sections

All hollow sections are to be connected by electric welding.

For butt welds the fusion surfaces of each member must be properly aligned and prepared.

I. Electronic Welding

All welding is to be in accordance with the requirements of B.S. 499-1 and the electrodes shall comply with B.S. EN 60974-6

Fusion faces shall be free from irregularities which could interfere with the welding material. Those faces also be free from any deleterious matter such as rust, grease and paint.

All welds shall be prepared by planning or machine flame cutting. During welding all parts will be maintained in their correct position.

Welds shall be carried out with each run closely following the one prior with sufficient time between to allow for removal of slag.

Each run of weld is to be inspected and the Sub-Contractor shall ensure that unsatisfactory welds are cut out or remade to the required standard.

The minimum size of fillet weld shall be 6mm.

All completed welds shall have a regular and smooth surface. The weld material shall be solid complete fusion throughout the weld and to the forecut metals.

Any defects shall be cut out or made good to approval. External faces of butt welds to be ground smooth.

J. Painting

All steel is to be wire brushed and any loose scale, dirt or grease shall be removed before any painting is commenced. One coat of red oxide primer type A B.S. 2523 shall be applied at the shop.

Any damaged to priming paint shall be made good to the Engineer's satisfaction.

STRUCTURAL STEEL WORK

A. Quality of Materials and Workmanship

The quality of all materials and workmanship used in the execution of this Contract shall comply with the requirements of the most recent issues of the following British Standards and Codes of practice, including all amendments to date of calling for Tenders.

BS. 4 (Pt.1) - Hot Rolled Sections

BS. EN 10210-2 - Hot Rolled Hollow Sections

BS. 5950-1 - The use of Structural Steel in Building

BS. EN 60974-1 - Arc welding plant, equipment and accessories

BS. EN 60974-6 - Covered Electrodes for the manual Arc Welding of Mild steel and medium tensile steel

BS. 916 - Black bolts, screws and nuts.

BS.1449-1 (Pt. 1) - Steel plate, sheet and strip.

BS. 6323-1 - Steel tubes for Mechanical, Structural and General Engineering purposes.

BS. En 10162 - Cold Rolled Steel Sections.

BS.4190 - ISO metric black hexagon bolts, screws and nuts.

BS.4320 - Metal washers for general engineering purposes **BS.**

EN 10210-1 - Weldable structural steel.

BS. EN 10210-2 - Hot rolled structural steel sections.

BS. 4872-1 - Approval testing of welders when welding procedure approval is not required

BS. EN 1011-2 - General requirements for the Metal Arc Welding of structural steel.

BS.5493 - Protection of iron and steel structures from corrosion.

The Engineer may at any time require any materials to be tested in accordance with the requirements of the Standards listed above. The cost of all successful tests shall be borne by the Client, but the Sub-contractor shall if required promptly supply at his own expense test pieces as required by the Engineer. The costs of tests on materials failing to comply with this Standard shall be borne by the Sub-contractor. If in the opinion of the Engineer, faulty materials and/or workmanship have been used in the works, the Sub-contractor may be directed to dismantle and cut out the parts concerned and remove them for examination and testing. The cost of dismantling, cutting out and making good to the approval of the Engineer shall be borne by the Sub-contractor.

B. Fabrication

(a) Cutting and Bending

All members, plates, brackets, etc., shall be neatly and accurately sheared, sawn or profiled to the required shape as shown on the drawings. Where steel is oxy-cut to shape, care shall be taken to preserve the full finished sizes required. If members or plates are bent or set, the bends or sets shall be correctly made to the radii or angles specified without leaving hammer marks. The material may be heated to permit this. Material that has been heated shall be annealed to approval.

(b) Punching and Drilling

Holes for black bolts shall be drilled or punched 2mm larger in diameter than the bolt used. Hole for high tensile friction grip bolts shall be drilled or sub-punched and reamed to 2mm larger in diameter than the specified bolts size. All drilled holes shall be parallel sided and shall be drilled with the axis of the holes perpendicular to the surface, badly drilled holes shall either be reamed out to approval and larger bolts fitted or otherwise as directed. All rough arises shall be ground off. Holes for bolts in material thicker than 15mm must be drilled. When holes are drilled in one operation through to or more thickness of material, the parts shall be separated after drilling and all burrs removed before assembly. Holes for bolts shall not be formed by a gas cutting process.

All members shall be fabricated with a tolerance in length of +0mm and -3mm, all shall not deviate from straightness by more than 1 in 400.

The allowance for angular twist shall be $(3+0.6L)$ mm where L is the length of the member under consideration in meters. Twist shall be measured by placing the member as fabricated against a flat surface measuring the difference between the two corners of the opposite end.

The above tolerance shall be adhered to unless otherwise specified to the Engineer's drawing.

C. Fastening

Bolting & Screwing

All bolts used shall be such length that at least one full thread is exposed beyond the nut after the nut has been tightened. Where a nut or bolt head would bear on an inclined surface, a bevelled washer of the correct shape shall be interposed between the two surfaces. Bevelled washers shall not be allowed to get out of position during fabrication and erection and for this purpose may be spot welded to the steel surface. Bevelled washers for use with high tensile bolts may not be welded.

Black bolts, nuts and washers, shall comply with the requirements of BS.916 or alternatively BS.4190 ISO metric black hexagonal bolts screws and nuts.

Self Drilling Screw ; All self drilling screws used shall be of such length that at least one full thread is exposed beyond the purlin. The self drilling screws should be correctly driven (not under or over

driven) such that the rubber seal should be in line with the underside with the hexagonal head.

All self drilling screws must have a corrosion resistance tested to a requirement of at least 1000 hours as per AS 3566 clause 3 or equivalent British Standard.

High tensile bolts, nuts and washers, friction grip bolts.

All high tensile steel bolts, nuts and washers used in joints shall comply with the requirements of BS.4882 and shall be used in accordance with BS.4882

Pressed steel purlins

Pressed or cold rolled steel purlins and girts shall be to the sizes indicated on the drawings and shall be formed from approved steel strip with a minimum yield strength of 185N/sq.mm.

The sections shall be manufacture straight and free from twist, the tolerance away from straightness shall not be greater than 2mm for every 1.500mm in length along any folded edge.

D. Electric Welding

All welding shall be carried out in strict accordance with the requirements of BS.499-1 and electrodes shall comply with BS. EN 60974-6.

Fusion faces shall be free from irregularities such as tears, fins etc., which would interfere with the deposition of weld metal.

Fusion faces shall be smooth and uniform and shall be free from loose scale, slag, rust, grease, paint and/or other deleterious material.

All welds shall be of acceptable types, shall be of the finished sizes specified, and shall be carried out in such sequence that minimum distortion of the parts welded results.

Preparation of edges for welding shall be carried out by planing or machine flame cutting. Manual flame cutting may be permitted in certain circumstances.

Parts to be welded shall be maintained in their correct relative positions during welding, preferably by jigs.

Multiple run welds shall be carried out with each run closely following the previous run but allowing sufficient time for the proper removal of slag.

The Sub-contractor shall ensure that each run is inspected and unsatisfactorily weld cut out and remade to approval.

Welds in material 25mm or greater in thickness shall be made by the Argon Arc or similar approved process, and special precautions shall be taken to prevent weld cracking.

Unless otherwise shown, the minimum size of fillet shall be 6mm.

On completion, welds shall present a smooth and regular finish. Weld metal should be solid throughout with complete fusion between weld metal and parent metal and between successive runs throughout the joint.

Defects shall be cut out and made good to approval in sound weld metal.

The external faces of butt welds are to be ground smooth on completion and to be to the approval of the Engineer.

E. Shops and Field Connections Rolled Sections

All shop connections shall be electric welded or bolted with high tensile friction grip bolts.

No bolts used shall be less than 12mm diameter and no weld less than 40mm in length. At least two bolts shall be used in connections transmitting loads unless indicated by the Engineer.

No weld of length less than four times the nominal fillet size shall be deemed capable of carrying a load.

Beam to column connections not detailed shall be on "standard" top and bottom cleat connections with the load carried on the bottom cleat. "Standard web connections shall be used for connecting beams to beams.

Field connections shall be as detailed, i.e bolted with high tensile or black bolts in drilled holes. Black bolts in punched holes will only be permitted for connections carrying a designed load for or for connections to timber members.

F. Structural Hollow sections – Circular and Rectangular

Hollow sections shall be connected by electric welding unless shown otherwise.

The design of welds shall be in accordance with Clause and 54 and Appendix C of BS.449.

G. Trusses and Portal Frames

Trusses shall be carefully set out to the dimensions shown on the drawings.

Where it is required that trusses be cambered, such camber shall be provided by bending the bottom chord to the arc of a circle.

Notwithstanding any dimensioned spacing of purlin cleats, the Sub-contractor shall ensure that purlin cleat spacing is satisfactorily for the available stock lengths of roof sheeting. However, the Engineer's approval must first be obtained before any alteration is made in purlin spacing or sheeting sizes.

Splices in portal and other frames shall be made where shown on the details.

H. Boxed Members

Abutting edges of boxed members shall be connected and sealed with a continuous weld to exclude the entrance of moisture. Where specified such welds shall be ground flush to approval.

I. Shop Assembly

Such assembly of units in the shop as is specified or necessary before transporting to the site will be inspected by the Engineer before painting. The work will be laid out in the shop or yard so that all parts are accessible for inspection and testing of the work.

The Sub-contractor shall furnish all facilities for inspection and testing of the work and he must notify the Engineer on each occasion when the material is ready for inspection.

J. Marking

All members of the structure to be site assembled shall be match marked in accordance with the shop details and marking plans submitted for approval.

K. Erection

Site Dimensions

No erection shall commence before accurate site dimension have been taken by the Sub-contractor, and no claim will be considered should final dimensions differ from those on the drawings. Any modifications to the structural steel required in order to comply with site dimensions shall be made on the ground to the Engineer's approval before erection is commenced.

General Setting Out-Tolerances

The temporary Bench Mark (TBM) which shall be located at the structural ground floor level (S.G.F.L) having been agreed on site between Engineer, Engineer and Main Contractor, shall be considered as the site datum.

The datum points for the setting out of the datum lines passing through the T.B.M at all floor and roof levels; +/-0m.

The permissible Deviation (P.D) from the T.B.M and D.L shall be as follows:-

a) Setting out on plan at S.G.F.L.

All setting out dimensions with respect to each datum line (i.e P.D from "x" and " y" plane axes) +/-10mm per 30 meters.

b) Transfer of T.B.M to Structural first floor, Intermediate floors and roof levels.

With respect to the T.B.M at S.G.F/L the T.B.M at:

First Floor Level +/-5mm Intermediate

Floor Levels +/-10mm Roof Level +/-

15mm

c) Setting out on plan of upper floors with respect to the Transferred T.B.M.

All setting out of dimensions with respect of each datum line +/- 10mm per 30 meters.

1120111 relevant T.B.M of the upper or lower surface of any truss or element, taking into account specified chambers. +/-10mm.

f) The plumb vertical members +/-10mm per storey.

All erection shall be carried out by competent and experienced men and the Sub-contractor shall take every care to safeguard the public, workmen and adjoining property.

All gear used shall be of adequate strength and shall comply with all regulations current at the time.

The subcontractor shall be held responsible for all damage caused to the structure, workmen or buildings erection.

L. Storing and Handling

Steel shall be stored and handled and erected in such a manner that no member is subjected to excessive stresses which could have an adverse effect on the properties of the steel. If in the opinion of the Engineer, the steelwork has been subjected to such treatment, and Contractor shall remove this steel from the site and replace it as his own expense.

M. Erection Details

No member or part of a member which has been bent or distorted shall be erected in that condition. All straightening shall be done on the ground.

Columns shall be wedged to line and level on steel or castiron wedges and checked by the Engineer. After acceptance, column bases shall be grouted to approval before wedges are removed. Unless shown on the drawing, all columns shall be left truly vertical and correct to line and level. Beams, girts, etc., shall be erected. level unless otherwise shown and correctly positioned.

Trusses and open web joists shall be carefully handled at all times and when being erected shall be lifted at such points and in such a manner as will preclude any possibility of damage from erection stresses.

Immediately after erection, each truss shall be made secure by purlins, bracing or guys to approval. Bracing shall be placed in position as soon as dependent work will permit.

N. Field Connections

In making connections, drifting of unfair holes will not be permitted and holes not matching properly shall either be reamed or drilled out and a larger bolt inserted or otherwise as directed.

Holes formed or enlarged by oxy-cutting will be condemned and must be filled to approval by electric welding and red drilled.

O. Tightening and Testing High Tensile Friction Grip Bolts

Before assembly, the contact surface, including those adjacent to the washers, shall be de-scaled or carry normal tight mill scale. They shall be free from dirt, oil, loose scale, burrs, paint (except priming paint) pits and other defects that would prevent solid seating of the parts.

Bolts shall be assembled with approved hardened flat or tapered washers as required between the bolthead and nut and the softer mild steel.

When bearing faces of the bolted parts have a slope of more than 1 in 20 with respect to a plane normal to the bolt axis, square smooth bevelled washers shall be used to compensate for the lack of parallelism.

All bolts shall be tightened by the "Turn of Nut" method. This method shall generally be as approved by the Engineer to achieve in all bolts a minimum tension equal to the proof load.

P. Grouting

Unless otherwise detailed on the drawings, a space of not less than twenty (20)mm and not more than forty (40)mm shall be provided between undersides of column base plates and footings, and between all beam and roof truss bearings and concrete pads, etc.,.

After each column, beam, or roof truss has been wedged up to a true line and level and fixed in position to approval, the space between footing or pad and the underside of the baseplate or steel member shall be grouted with a mixture of portland cement and approved washed sand.

The Portland Cement and sand shall be thoroughly mixed to approval in equal proportion by volume with only sufficient water to procedure a mixture of "damp earth" consistency and shall be used within twenty minutes of mixing. The Caulking mixture shall be packed to approval into the space between baseplate and foundation and protected from damage until set.

**Q. Painting
Paints**

All paints are to be supplied by supplier approved in writing by the Engineer.

Paints are to be delivered to the site or the Structural Contractor's works in the original containers as supplied by the manufacturers with seals unbroken and are to be used in strict accordance with the manufacturer's instructions. Manufacturer's representatives are to be free to visit the site and inspect materials and workmanship, and if necessary take samples of materials for laboratory analysis.

Paints are not to be thinned unless instructed by the Engineer.

No external painting is to be carried out during rain or when rain is likely to occur before the paint has had time to dry. All surfaces are to be dry and free from moisture at the time of paintings.

All structural steel shall be thoroughly scraped and wire brushed to remove mill scale and rust. Dirt and grease or oil shall be washed off with white spirit and the steel allowed to dry.

Painting

A first coat of Zinc Chromate Primer shall be applied in the works immediately the steel preparation has been completed. A minimum of 24 hours shall elapse before the steel is moved from its position whilst painting has been carried out. After delivery to site, the steel shall be carefully examined and all areas where the priming coat has been damaged and/or where rust has developed shall be washed with white spirit and wire brushed as necessary and a further priming coat as for the first applied to completely cover the damaged areas.

During erection, surface of steel which are to be in contact, shall be painted with one further coat of primer as previously described and the surface brought together whilst the paint is still wet.
described for Structural Steelwork.

Bolts, Nuts, Washers, etc., shall after erection is completed to approval, be carefully degreased with white spirit and painted as for steelwork.

Steel purlins and sheeting rails shall generally be painted as for steelwork except for purlins and rails supporting aluminium sheeting when the following specification shall be used.

1st coat - Red Oxide Zinc Chromate Primer 2nd

coat - An approved Aluminium paint

The interiors of mild steel gutters shall be prepared as previously described for Structural Steelwork.

R. Prices, Measures and Payment

Prices quoted by the Contractor shall be based on the calculated weights of steel and shall include for manufacture, painting and supply all as specified and as shown on the drawings, including the cost of delivery to the site or other agreed place or places and the supply of all bolts, rivets, plugs, gussets, cleats, stiffeners etc to complete the erection of the works. **Note where member overall size is specified and thickness or weight per unit length is not specified or clear take the minimum size specified in relevant British Standard for sections (refer pg 1) but shall not have less than 3mm wall, flange or web thickness.**

Prices shall include for erection (all labour, scaffolding, and other erection equipment necessary) and cover the cost or additional prime coat painting as previously specified. The prices shall also include for lining up, levelling and plumbing, but not for grouting up of the bases.

The basis for payment for steelwork shall be the calculated steel weights of the structure. Any variation from the original design on which the quotation was made, which results in either an increase or decrease in calculated weight of the structure as completed, shall result in the appropriate additions or deductions to the agreed quotation.

Any written instructions from the Engineer which may result in additional work over and above that for which the Contractor quoted will be considered as extras and shall be paid for on the basis of calculated additional steel weights.

S. Roof Sheeting

Roof sheeting and wall cladding shall comply with BS CP 143 and shall be capable of spanning 1.425m under a load of its own weight and an applied load of 0.25kN/m². Defective sheets shall not be used.

T. Rain Water Goods

Rain water goods shall be in accordance with BS.460. It shall be as per the details shown in the drawings and as per the direction of the Engineer. Rain water gutter and pipes shall be made out of steel sheets of the required thickness.

U. Fixing

Sheeting and Rain water goods shall be fixed in accordance with BS.494-1. IT4 sheets, ridges, flashing

sheets shall be fixed by skilled men as per standard procedure with sufficient number of bolts, washers and laid out properly on the roof so that there shall be no leakage of water during rains. Rain water gutter, pipes etc. shall be fixed properly with necessary accessories to avoid any leakage of rainwater.

V. Translucent Sheets

Translucent sheets shall be from standard manufacturer approved by the Engineer. These sheets shall have profile to match the rest of pre painted steel sheets on the roof. Skilled men shall be employed for fixing the sheets. Proper fixing of the edges of translucent sheets with the edges of steel sheet should ensure no leakage during rains. Defective sheet shall not be used and if formed after laying, such sheets should be replaced by goods sheets.

W. Composite IT4/LT5 Sheets with Insulation

Shall be formed with 2 Nos. IT4/LT5 sheets kept 50mm apart by 20-gauge (or as specified on the drawings) Galvanised Iron (girth =150mm) spacer cold formed into channel. The spacers are at the same centres as the purlins i.e. 1.425m centres unless stated otherwise by the Engineer. The insulation shall be mineral fibre 50mm thick packed and sealed in 1000g polythene bags of size convenient to handle and laid over the lower sheet. The connection between the sheet and ms purlin and with GI spacer shall be with J Bolts or self drilling roof screws.

X. Inspection & Approvals

The Contractor shall submit to the Engineer shop/fabrication drawings (showing general arrangements, connection details i.e plates, welds, bolts, bolt holes, sleeves, etc) for approval and shall not commence any fabrication before the shop drawings are approved. The Contractor shall give the Engineer 5 (five) working days to comment /approve the drawings. The contractor shall give the Engineer at least 48hr notice to inspect any part of the work either in the yard or on site, this time shall be doubled if the site is more than 100 km from the nearest permanent office of the Engineer.

PLASTER WORK AND OTHER FINISHES

A. Cement

The cement shall be previously described in “Concrete Work”.

B. Sand

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

C. Lime

The lime for plastering shall comply with B.S. EN 459-1 Class “A” for non-hydraulic lime and shall be as rich as obtained and to approval. It must be freshly burnt and shall be slaked at least on month before being used by drenching with water, well broken up and mixed and the wet mixture shall be passed through a sieve of two meshes per square millimetre. Lime putty shall consist of freshly slaked lime as above described, saturated with water until semi-fluid and passed through a fine sieve; it shall then be allowed to stand until superfluous water has evaporated and it has become of the consistency of thick paste, in no case for a shorter period than one month before being used during which it must be kept damp and clean and no portion of it allowed to become dry.

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

D. Composition of Plasters, etc.

A mix referred to, as 1:4 shall mean 40 Kg. of cement and 0.10 cubic metres of sand. All other mixes shall be construed in a like manner.

E. Hacking, etc.

The prices for all pavings and plastering, etc. shall include for hacking concrete surfaces and for raking out joints of walls 12mm deep and for cross-scoring undercoats to form a proper key.

Plastering on walls generally shall be taken to include flush faces of lintels, beams etc. in same.

F. Surfaces

All surfaces to be paved or plastered must be brushed clean and well wetted before each coat is applied. All cement pavings and plaster shall be kept continually damp in the interval between application of coats and for seven days after the application of the final coat.

G. Dubbing Out

Where required shall be composed of one part cement to six parts of sand.

H. Partially Set Mixes

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.

I. Samples

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 Engineer, after which all work executed shall confirm with the respective approved samples.

J. Finish Generally

All screeds, pavings etc. shall be finished smooth even and truly level unless otherwise specified by the whatever method the Contractor thinks fit excepting screeds, pavings etc. to receive vinyl tiles which shall be steel trowelled.

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

All work shall be to approval and any not complying with the above shall be hacked away and replaced at the Contractor's expense.

K. Arrises and Angles

All arrises and angles shall be clean and sharp or slightly rounded or thumb covered as directed, including neatly forming mitres.

L. Making Good

All making good shall be cut out to a rectangular shape, the edges undercut to form dovetail key and finished flush with face of surrounding paving or plaster. Cut out and make good all cracks blisters and other defects and leave the whole of the work perfect on completion.

M. Prices to Include

In addition to the foregoing prices of superficial items are to include for work in narrow widths all linear labours angles and arrises all fair edges for making good up to or stopping a line at the required level at top of skirtings or dados where directed and for making good up to windows, door frames and similar.

The prices for all linear items unless otherwise measured are to include for all short lengths, angles and arrises, mitres and ends of every description.

N. Prices for Paving

Prices for pavings, screeds etc. are to include for adequate covering and protection during the progress of the Works to ensure that the floors are handed over in perfect condition on completion.

O. Floor Screeds

Floor screed shall be composed of green or red-coloured cement and sand (1:2) and shall not be laid in areas exceeding ten square metres during any period of 24 hours. As bays are formed steel edge strips must be used to retain the exposed edge of the screed.

P. Two-Coat Lime Plastering

Lime plastering shall consist of a first coat in cement, lime and sand (1:2:9) and a finishing coat of lime putty skim with 10% cement added. The two coats shall have total finished thickness of not less than 15mm on walls and on 10mm total thickness on concrete soffits, beams, edges etc.

The first coat shall be trowelled to a perfectly true and even surface and finished with a wood float, the surface being sprinkled with water from a brush during the process and before it has set thoroughly scratched to form a key. The finishing coat shall not be less than 1.5mm thick, thoroughly worked with a steel trowel sprinkled with water as before and be brought to a uniform smooth and hard surface.

Q. White Glazed Wall Tiles

White glazed wall tiles shall be of local manufacture size 150 x 150 x 6mm thick, with associated fittings all to B.S. EN 14411. Tiles shall be well soaked in water, laid with straight horizontal and vertical joints on and including cement and sand (1:4) screed 10mm thick bedded in cement mortar (1:3) pointed in white cement and cleaned down on completion, all to approval.

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

R. Granolithic Paving

The granolithic shall consist of one part cement (by volume) to two and a half parts (by volume) of local granite chippings graded from 6mm down to 3mm with not more than 15% to pass a No. 50 B.S. sieve.

Granolithic shall be spread and given only sufficient trowelling to produce a perfectly level surface immediately after laying. When the granolithic has stiffened sufficiently so that a hard surface can be obtained without laitance then the surface shall be polished with a steel float to a perfectly even and smooth surface. On no account will dusting with neat cement to the surface be permitted.

S. Polished Terrazzo

Polished terrazzo shall consist of a screed or backing coat and a finishing coat of “Snowcrete” and marble chippings (1:2) mixed with “Cementone No. 1” colouring compound in accordance with manufacturer’s instructions. Overall thickness are to be as later specified.

The finishing coat shall be a minimum of 12mm thick for paving and 9mm thick for wall finishes, trowelled to a smooth and even finish and well rubbed and polished with carborundum. The finished texture and colour shall be similar to a sample approved by the Engineer.

T. Plasterboard Ceilings

Plasterboard Ceiling linings shall be of an approved plasterboard ceiling lining. The boards shall be of the thickness stated in the Bills of Quantities and shall consist of an aerated or formed gypsum core encased in and firmly bonded to specially prepared durable paper.

The plasterboard shall be fixed to galvanized mild steel metal studs of at least 0.5mm minimum thickness and from approved Manufacturer. All accessories including fibre tapes, finishing compounds corner beads etc. shall be provided.

The plasterboards, metal studs and suspension system shall all be fixed in accordance with the Manufacturer’s

printed instructions.

U. Decorative Plaster

External rendered surfaces shall generally be finished in factory manufactured decorative plaster to thickness stated in the Bills of Quantities. The materials and method of application shall all be specified in the Manufacturer's printed specifications and catalogues all as specified in the schedule of finishes.

The address for the supplier is to be provided by the Tenderer

V. Porcelain Floor Tiles

Porcelain floor tiles shall be from an approved European Manufacturer. The tiles shall be of regular pattern and thickness. The tiles shall be laid with approved adhesives.

W. Floor Tile Adhesive Application and Tile Laying

1. Substrates must be sound, free from oil, grease and sufficiently dry. Cementitious substrates must be cured.
2. Wipe the back side of tiles with water if dusty.
3. Mix adhesive according to manufacturers specifications.
4. Allow to stand for 5-10 minutes to mature. After remixing, the paste is ready for application.
5. To ensure good adhesion first apply a thin coat on the substrate with the flat side of the trowel, then notch with the toothed side of the trowel.
6. Spread the adhesive mortar onto the substrate with a notched trowel, using a handing angle of 45-60 degrees, to a maximum surface area of 2 sm. Ensure trowel notch size is appropriate for the tile dimension. (see table below).
7. When laying tiles of over 400 x400, the bed mortar is applied with a notched trowel as usual. In addition, just before laying the tiles, a thin layer of mortar is applied to the backside of the tiles.
8. The tiles are then laid by pressing and making small rotation movements to ensure that the glue gets in total contact with both surfaces.
9. Additionally, the tiles should be fixed with the help of a rubber hammer in order to increase the holding power and spread of the mortar under the tile being leveled.
10. Observe construction joints (expansion, contraction, fraction, perimeter and corner joints) and the joints between concrete slab pours.
11. Joints should be a minimum of 3mm, and grouting should take place after a minimum of 48 hours.
12. On floor areas of over 30 sm, leave partition joints to be filled with flexible material, like grey silicone. These should be a maximum of 6 metres apart.
13. Always allow a free perimeter expansion joint of a minimum of 3mm between the floor and the wall or column, hidden by a skirting.

KALEKIM 1052 RECOMMENDED NOTCHED TROWEL SIZES

Up to 100 x100 tiles	U4 (4x4)
Up to 200 x200 tiles	U6(6x6)
Up to 400 x400 tiles	U8 (8x8)
Greater than 400 x400 tiles	U10 (10x10)

PEGACOL RECOMMENDED NOTCHED TROWEL SIZES

Up to 100 x100 tiles	U4 (4x4)
Up to 450 x450 tiles	U6(6x6)
Up to 900 x900 tiles	U6(6x6) or U9 (9x9)
Greater than 900 x900 tiles	U9 (9x9)

X. Protection

The Contractor's rates for all finishings shall allow for adequate protection against damage by all following trades or any other cause to the satisfaction of the Engineer.

PAINTING AND DECORATING

A. Approved Specialist

All work under this trade must be executed by an approved Specialist unless the Engineer agrees otherwise.

B. General

The Contractor shall also arrange his programme of work that all other trades are complete and away from the area to be painted when painting begins. Before painting the Contractor must remove all concrete mortar dropping and the like from all work to be decorated and remove all stains from and obtain uniform colour to work to be oiled and polished.

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

C. Painting Generally, _

All materials are to be of the best quality and to Engineer's approval.

All materials to be applied externally shall be of exterior quality and/or recommended by the Manufacturers for external use.

All materials shall be delivered on Site intact in the original sealed drums or tins and shall be mixed and applied strictly in accordance with Manufacturer's instructions and to the approval of the Engineer.

Unless specially instructed or approved by the Engineer no paints distemper, etc. are to be thinned or otherwise adulterated but are to be used as supplied by the Manufacturers and direct from the tins.

If required by the Engineer the Contractor is to provide at his own expense samples of paints etc. with containers and cases to be forwarded carriage paid by the Contractor for analysis to a laboratory. The priming undercoats and finishing coats shall each be of differing tints and the priming and undercoat shall be the correct brands and tints to suit the respective finishing coats in accordance with the Manufacturer's instructions. All finishings coats shall be of colours and tints selected by the Engineer. Each coat must be approved by the Engineer before the next coat is applied.

Each coat shall be properly dry and in the case of oil or enamel paints shall be well rubbed down with fine glass paper before the next coat is applied. The paintwork 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 Engineer before laying on, and such samples when approved shall become the standard for work.

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 Engineer.

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

Prices of paint, distemper, etc. shall include for preparation of surfaces rubbing down between each coat, stooping, knotting, etc., and all other work in connection and as described and as necessary to obtain a first class and proper finish to approval.

Emulsion paint on ceiling and all undercoats of emulsion paint and complete oil painting on walls shall be completed before flooring are laid. Final coats of emulsion paints on walls shall be applied after such flooring has been laid complete.

D. Samples

The Contractor shall furnish at the earliest possible opportunity before work commences and at his own cost samples of painting for the Engineer's approval and any further samples in the case of rejection until such samples are approved by the Engineer and such samples when approved shall be a minimum standard for the work to which they apply.

The Engineer may reject any materials or workmanship not in his opinion up to the approval sample and these must be removed from the site without delay.

E. Preparation and Priming of plaster etc., surfaces

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

Plaster surfaces which are to be finished with emulsion oil or enamel paint shall be primed with an approved primer and applied in accordance with the Manufacturer's instructions.

F. Preparation and Priming of Fibreboard

Fibreboard or similar surfaces shall be lightly brushed down to remove all dirt, dust and loose particles and have all nail holes or other defects stopped with an approved plaster stopping compound rubbed down flush and left with a texture to match surrounding material and shall receive one coat primer at last.

G. Preparation and Priming of Metalwork

All surfaces shall be thoroughly brushed down with wire brushes and scraped where necessary to remove all scale rust etc., immediately prior to decorating and given one coat of red oxide primer. Where severe rust exists and if approved by the Engineer a proprietary de-rusting solution may be used in accordance with the Manufacturer's instructions.

Galvanized surfaces shall be treated before painting with a solution of calcium plumbate, applied in strict accordance with the Manufacturer's printed instructions or with an approved calcium plumbate primer.

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

H. Preparation and Priming Woodwork

All woodwork shall be rubbed down, all knots covered with a thick coat of good shellac or aluminium knotting primed with one coat of approved ready-mixed proprietary wood primer and all cracks, nail holes, defects and uneven surfaces etc. stooped and faced up with hard stopping rubbed down flush. Plywood shall be brushed filled over the entire surface.

Woodwork to receive finishes other than paint shall have all stains removed, be well rubbed down and have all defects levelled with hard stopping of a colour to match the adjoining surface.

I. Existing Painted and Decorated Surfaces

In addition to the preparation described above existing painted plaster, metal or wood etc., surfaces shall be rubbed down to expose the material beneath and old paint burnt off with blow torches if necessary in the Engineer's opinion.

J. Wood Preservative

All woodwork in contact with walling or plaster shall be treated after cutting and preparation but before assembly or fixing with one coat of approved wood preservative to Engineer's approval.

K. Wax Polish

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

L. Cement Paint

Shall be to Engineer's approval. Two coats shall be applied after preparation as specified above.

M. Emulsion Paint

Emulsion paint shall be to Engineers approved. After preparation as specified above a minimum of three coats shall be applied using a thinning medium of water only if and as recommended by the Manufacturer.

An approval plaster primer tinted to match may be submitted for the first coat.

N. Enamel Paint on Metalwork and Woodwork

Enamel paint shall be to Engineer's approval. Apply one undercoat and two finishing coats, after preparation and priming as specified above.

O. Ironmongery

Where instructed, all ironmongery shall be removed from joinery, steel windows and louvres before painting is commenced, and shall be cleaned and renovated if necessary and refixed after completion of painting.

P. Painting Items

Painting items are billed hereafter shall include for preparing and priming surfaces as above described.

Q. Cover Up

Cover up all floors, fittings etc. with dustsheets when executing all painting and decorating work.

R. Clean and Touch Up

Paint splashes, spots and stains shall be removed from floors, woodwork etc. any damaged surfaces touched up and the whole of the work left clean and perfect upon completion.

GLAZING

A. Glass

All glass shall comply with B.S. 952-2 free from flaws, bubbles, specks and other imperfections. All glass shall be delivered in proper container with maker's name guarantee, type of glass and thickness or weight of glass attached to the outside of the containers.

Glass panes shall be cut to sizes to fit the openings with not more than 1.50mm play all round and where puttied shall be sprigged to wood or clipped to metal frames.

Clear sheet glass shall be ordinary glazing (O.Q.) quality. Polished plated glass shall be G.G. quality.

Obscured glass shall be roughcast plain rolled glass 4mm thick.

Wired glass shall be polished Georgian wired glass 6mm thick.

B. Beads and Washleather

The glass to doors and screens and other places where vibration may occur shall be bedded in washleather with beads and fixed with brass cups and screws.

The timber rebates shall be cleaned, primed and painted with one coat of oil paint.

C. Bedding Strips

Shall be of plastic or washleather approved by the Engineer and shall be cut to fit exactly the line of frame and beads.

D. On Completion

Remove all broken, scratched or cracked panes and replace with new to the satisfaction of the Engineer. Clean inside and out with an approved cleaner. On no account shall windows be cleaned by scraping with glass.

E. Mirrors

Mirrors are to be selected quality clear plate of float glass to B.S. 952-2 with plain polished edges unless otherwise specified. The mirrors shall be tropicalised to the approval of the Engineer. All mirrors shall be pre-drilled for fixing screws and shall be free from all flaws and imperfections.

MECHANICAL ENGINEERING INSTALLATIONS

Mechanical Engineering Installations shall be carried out in accordance with the appended Specifications for Mechanical Engineering Services. The Works generally includes plumbing, drainage and fire fighting installations, air conditioning and mechanical ventilation installation.

The Main Contractor shall arrange and monitor programme for the work of the Sub-Contractor and for all other Sub-Contracts affected by them including the Electrical Installations Sub-Contract if any. The Main Contractor shall ensure that all work and Builder's Work in connection is carried out in a sequence which will allow under-floor drains, piping in ducts, chases and the like leading to or from all sanitary fittings, hot or cold water tanks, gully traps, vent pipes and the nearest manholes to be installed in their correct positions in order to minimise the amount of cutting of holes, chases, floor ducts, etc as much as possible.

The Main Contractor shall carry out the builder's work in connection with the Sub-contract including cutting or forming holes and chases and later making good.

ELECTRICAL INSTALLATIONS

The Electrical Installation work shall be executed in accordance with electrical works Specifications.

The Builder's Work in connection with electrical installation shall be carried out by the Main Contractor.

All necessary pipe ducts and the like shall be built in as directed by the Engineer in readiness for the Electrical works.

All conduits, junction boxes and other requirements shall be built into the concrete floor and roofing slabs where required and adequate notice shall be given to the Electrical Sub-Contractor and the Engineer to enable these to be positioned before concreting.

SPECIFICATIONS FOR ELECTRICAL INSTALLATIONS

1 GENERAL

This section specifies the general requirement for plant, equipment and materials forming part of the Sub-contract Works and shall apply except where specifically stated elsewhere in the Specification or on the Contract Drawings.

1.1 Quality of Materials

All plant, equipment and materials supplied as part of the Sub-contract Works shall be new and of first class commercial quality, shall be free from defects and imperfections and where indicated shall be of grades and classifications designated herein.

All products or materials not manufactured by the Sub-contractor shall be products of reputable manufacturers and so far as the provisions of the Specification is concerned shall be as if they had been manufactured by the Sub-contractor.

Materials and apparatus required for the complete installation as called for by the Specification and Contract Drawings shall be supplied by the Sub-contractor unless mention is made otherwise.

Materials and apparatus supplied by others for installation and connection by the Sub-contractor shall be carefully examined on receipt. Should any defects be noted, the Sub-contractor shall immediately notify the Engineer.

Defective equipment or that damaged in the course of installation or tests shall be replaced as required to the approval of the Engineer.

1.2 Regulations and Standards

The Sub-contract Works shall comply with the current editions of the following:

- a) The Kenya Government Regulations.
- b) The United Kingdom Institution of Electrical Engineers (IEE) Regulations for the Electrical Equipment of Buildings.
- a) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.
- d) British Standard and Codes of Practice as published by the British Standards Institution (BSI)
- e) The Local Council By-laws.
- f) The Electricity Supply Authority By-laws.
- g) Local Authority By-laws.
- h) The Kenya Building Code Regulations.
- i) The Kenya Bureau of Standards

1.03 **Power Supply on Site**

The supply voltage will be 240 volts single phase or 415 volts 3 phase 50 Hz. TN-S system, viz. separate neutral and protective conductor throughout the system.

2. **INSTALLATION OF CABLES**

2.01 **General**

Bending of cables shall be in accordance with table 52c of the IEE Regulations and no cable shall be bent to radius less than that specified by the cable manufacturers.

Cables shall be rated for the maximum connected load with due consideration to the following factors:-

- (i) Voltage drop not in excess of 4% of the nominal voltage.

- (ii) Ambient temperature.
- (iii) Degree of excess-current protection.
- (iv) Grouping.
- (v) Cables run under defined conditions.

2.02 Cables in conduits and Trunking

All cables shall be polyvinyl chloride (PVC) insulated to BS 6604, "PVC-insulated cables (non- armoured) for electric power lighting", 450/750 volt grade, unless an alternative is specified elsewhere in the contract documents. The quality and size of cables contained in any one conduit shall comply with IEE Regulation 529-7 and Appendix 12.

No cable with a cross-section area of less than 1.5mm² shall be used. All cables installed in a conduit or trunking system shall be PVC single insulated conductors and shall be colour coded in accordance with the IEE Regulation 524-3 and Table 52A.

Final sub-circuits shall be run in conduits separate from main or sub-main cables. All cables in conduit shall be drawn in simultaneously. All cables shall be drawn in without the use of excessive force, Without the use of lubricants and the wiring shall be easily withdrawable.

2.03 PVC/SWA/PVC Cable

These cables shall comprise copper conductors unless specifically detailed otherwise, laid up with PVC fillers bedded with an extruded inner PVC sheath, armoured with a single layer of galvanized steel wires, aluminium or strip as specified, and covered overall with PVC sheath.

Cables shall be manufactured to BS 6346 "PVC insulated cables for electrical supply" with conductor dimensions and resistances in accordance with BS 6360 1969, "copper conductors in insulated cables and cords", Armouring shall be galvanised steel to BS 1442.

Attention is drawn to Chapter 52 of the IEE Regulations and Appendix 9. Where the armour wires of cables are used to provide protective conductor they shall comply with the requirements of Chapter 54 of the IEE Regulations, particularly section 543; alternatively, additional cables with copper conductors shall be installed to reduce the impedance to a level which ensures compliance with Section 543 of the IEE Regulations.

Unless permission is given by the Engineer, no joints will be allowed. In the event of joints being authorized, they shall be made using plastic boxes of approved design filled with an approved cold pouring plastic or resin compound. The cable box shall incorporate suitable copper tapes and clamps to bond the armouring of the jointed cables.

The PVC/SWA/PVC cables should be terminated in the cable manufacture's approved glands. These shall be of the compression type providing controlled radial compression of the sheath seal. The gland shall incorporate an armour clamping ring and earthing ring and, where used outdoors, a lead washer shall be used to ensure a watertight joint between the gland and the unit to which it is fitted. The earthing ring shall be rigidly fixed to the item of equipment and terminated using brass nuts, bolts and washers. All gland terminations shall be protected by a PVC shroud which shall fit tightly over the cables.

The electrical Sub-Sub-Contractor is responsible for determining the true nature and extent of cable routes. No claim on the grounds of lack of knowledge will be entertained. All cable routes shall be agreed with the Engineer. After the cables have been installed and terminated, but prior to putting into service, they shall be subjected to an insulation test of 500 volts and the results of these tests (recorded on test sheets) forwarded to the Engineer.

3. CONDUIT AND CONDUIT FACILITIES - MILD STEEL CONDUIT SYSTEM

3.01 Conduits

Conduits shall be installed as required by the IEE Regulations and as detailed in this specification. All metal conduits must be heavy gauge, seam welded, steel tube screwed conduits manufactured to BS 31, "steel tube screwed conduits and fittings for electrical wiring", Class B, BS 4568, "Steel conduit and fittings with thread of ISO form for electrical installation", for metric conduit, unless specified otherwise. Conduits shall be finished black stove enamelled, except in positions exposed to water (other than water used in construction), steam condensation or the action of weather, where hot galvanised conduits shall be used.

Any conduits work rejected by the Engineer shall be replaced at no extra cost. No conduit smaller than 20 mm in

diameter or longer than 50mm diameter shall be used.

All bends in conduit shall be in accordance with the IEE Regulation 529-5, and made in a conduit bending machine fitted with a former of the correct radius for each conduit size.

Conduits shall be secured in an efficient pipe vice whilst being screwed. Conduit system shall be installed so as to ensure compliance with requirements of IEE Regulations 529-7. Attention is drawn to Appendix 12 of the IEE Regulations.

3.02 Conduit Fittings

Conduit fittings shall have same finish as the conduits being used and shall comply with BS 31 or BS 4586. All conduit fittings shall be screwed or loop-in malleable iron circular type, fitted with covers secured by brass screws. Rectangular adaptable steel boxes may be used on multi-conduit runs.

All circular type boxes must be fitted with long screwed spout conduit entries with the screwed thread terminating within the spout and the edges of the internal orifice of the box rounded and smoothed to act as a bush except for the adaptable steel rectangular boxes and loop-in conduit boxes, in which case male bush and coupling must be used for conduit connections. In concealed installation, boxes shall be fixed with the rims flush with the finished surface, but when, for any reason whatsoever, the rims are below the surface, suitable extension rings of the required depth shall be provided and installed to finish flush with the surrounding surfaces and with the lids of sufficient oversize (7.5 mm minimum all round) to cover the junction between box and plaster. In no case will the use of site-manufactured bends, sets, elbows, inspection elbows or tees be permitted.

3.03 Fixing of Conduits

All conduits must be firmly and rigidly fixed to be entirely without whip or movement. Space-bar saddles, or strap saddles, must be used on the timbers in roof spaces and will be allowed when the conduits are run on the underside of exposed unsealed floor or ceiling joints. Pipe hooks or crumpets will not be allowed except for security conduits in chases, or screeds, when the top of the hook must at least be 10 mm below the finished surface of the wall, or 25 mm below the floor finish. Pipe hooks shall be galvanised.

The finish of the saddles must in all cases conform to the finish of the supported conduits. Galvanised, sherardised or cadmium plated screws shall be used in all cases where galvanised conduits are installed.

The standard cast iron distance saddle, (single fixing base and two-screw fixing top), must be used for all conduits run on the surface of walls and ceilings etc., fixed at intervals of not more than 1.2 metres.

3.04 Conduit Runs and Concealment

The routes of the conduit installation shall be agreed with the Engineer prior to commencing the installation. Conduits shall be installed at least 150 mm from, and preferably under, any hot water pipes and at least 50 mm from other surface pipes and cables. Conduits shall be bonded to other surfaces in accordance with the requirements of IEE Regulations 413-2 and 547-4 to 547-7 inclusive.

Each continuity test shall be applied to the system before plastering, screeding, or casting of concrete is commenced. Surface work will be allowed where certain pre-fabricated methods of construction preclude the concealment of the runs, and or fair-faced brickwork or block work or other unplastered walls.

Conduit runs shall be planned to obviate the need for draw-in boxes, but where the use of such boxes is unavoidable they shall be accessible at all times and be fitted with covers. When Conduits are specified as being installed on the surface the runs must be arranged to render the whole system as neat and inconspicuous as possible, having regard to the existing Engineerural features. All vertical and horizontal runs must be taken where conduits converge and run together near distribution centres to obtain a symmetrical layout. The distance between the conduits shall be maintained through bends and sets and shall not vary noticeably.

3.05 Flexible Metallic Conduit

Flexible Conduit shall comply with the BS 731 part 1. "Flexible steel conduit and adaptors for the protection of electrical cables." It shall be used for the final connection from a rigid conduit installation to the terminal boxes of all the equipment provided with a means of positional adjustment and /or where vibration may reasonably be expected to occur.

Flexible conduits shall be PVC sheathed and shall be terminated using approved glands. In all instances a separate PVC insulated green and yellow coloured protective conductor complying with table 41A1 or 41A2 and section 543 of the IEE Regulations shall be installed, terminating at each end into purpose-made earthing

terminals.

Under no circumstances will flexible conduits be accepted in lieu of sets and bends in a rigid conduit installation.

In normal circumstances flexible conduits shall have a minimum length of 300 mm and a maximum unstretched length of 800mm. It shall permit a full range of withdrawal, adjustment or movement of the equipment.

3.06 Locking, Bushing and Coupling

All conduit ends must be filed square and reamed before erection to ensure freedom from internal burrs and roughness.

Running couplings shall only be used on black enamelled steel conduit installations, and the use of this shall be kept to the minimum. All running couplings shall be secured by means of the lock nuts or lock rings, and the exposed thread painted after installation.

Every conduit connection to the equipment, boxes, distribution boards, loop-in boxes, cable trunking etc, shall be made by means of a screw coupling and a male hexagonal headed smooth bore brass bush. The smooth bore shall be fitted to secure the conduit to the item connected via a purpose-made clear hole to be closed by the bush and coupling when fitted. Paint must be removed from the surface of the item connected to allow it to be covered by the end of the coupling which shall be filed, clean and square, to ensure a good mechanical and electrical metal to metal joint. Any exposed area of metal from which paint has been removed must be made good in a matching paint. Bushes shall be fitted and tightened by means of correctly fitting spanners. Mutilated bushes damaged whilst being fitted must be removed and replaced.

Conduits connecting via couplings shall be connected by a means of 15 mm long threaded section and shall have a gap of approximately 2 mm between them. No thread shall be exposed except running couplings.

3.07 Continuity and Earthing

The whole of the conduit installations shall be mechanically and electrically sound and continuous throughout their length in accordance with the IEE Regulations.

Where the conduit system is used to provide a protective conductor it shall comply with the requirements of Chapter 54 of the IEE Regulations particularly Section 543; alternatively, a separate protective conductor shall be installed in the conduit to comply with Section 543 of the IEE regulations.

4. CABLE TRUNKING-SHEET STEEL

Trunking shall only be installed in situations which will remain readily accessible throughout the life of the buildings. No cable trunking shall be installed behind a plastered ceiling or in other inaccessible situations.

All cable trunking shall comply with BS 4678, part 1 "Steel surface trunking" and part 2 for "Steel underfloor (duct) trunking".

Sheet steel cable trunking may be used on installations employing steel conduits, for connecting two or more switchboards together or where several conduits would otherwise have to run alongside each other. Proper allowance should be made for the derating of cables installed together in a container system. The cables must be capable of carrying the current imposed by the equipment connected. Attention is drawn to Chapter 52 of the IEE Regulations, particularly Section 522, and Appendix 9: the current carrying capabilities of cables indicated shall not be exceeded. The Engineer must be consulted as to precise details concerning trunking routes and applications.

All lengths of trunking shall be heavy gauge zinc coated steel connected together by internally fitted rectangular couplings of sufficient width to provide a minimum bearing face of 25mm, to which the lengths shall be bolted on site or welded at the factory.

Adequate provision shall be made to allow for expansion.

All Tee pieces and bends shall be formed with similar means of connection and the inner radii area shall be such that cables will not be bent through a radius less than that prescribed in the IEE Regulations. Only bends and tees of approved pattern will be accepted.

All fixing screws within the trunking shall be of the round head type. The trunking shall have an over-lapping well-fitted lid securely fixed to the trunking by approved means that will avoid damage to the cables. Self-tapping screws shall not be used.

All necessary accessories including long sleeve couplings, end piece, bends, sets, tees, reducers, branches, fillets, pinracks, cable retainers etc., shall be purpose-made units rather than being fabricated on site.

Where a change in direction of trunking run occurs, the deviation should be effected by a purpose-made unit manufactured on similar lines to the bends and tee pieces described above. Where this is not practical, changes in direction shall be fabricated in a neat workmanlike manner. All joints shall fit closely and gaps will not be permitted. All burrs and sharp edges shall be removed and no screw shall protrude into the trunking.

Trunking shall be firmly attached to its associated equipment either by bolted flanges or by male bushes and couplings.

Where trunking is connected to equipment by means of flange connectors, the entry into the equipment shall be of the same cross-section as the trunking.

Where trunking does not terminate in equipment, the otherwise open end shall be capped with a cover suitable bolted in position.

Where communications, extra low voltage circuits (category 1) etc., are contained in a trunking, the requisite number of separate compartments shall be provided to segregate the wiring. Where conduits are taken off such trunking they shall not pass through other compartments unless prior permission is obtained from the Engineer.

The entire trunking is required to be recessed in the structure of the building, the finished edge of the trunking is to be installed flush with the plasterwork.

Trunking runs shall be so arranged that the lid or cover plate is always on the top or side and not underneath, unless this cannot be avoided, in which case the Engineer's permission shall be obtained.

Wherever trunking passes through walls, vertical partitions etc., a fixed piece of trunking lid shall be fitted to the trunking extended 25 mm either side of the wall or other barrier, this is to allow removal of the adjacent lid without disturbing the building fabric. Care shall be taken to ensure that no opening is left between the trunking and the building structure through which fire might spread. In addition a suitable barrier of incombustible material shall be provided and fitted inside the trunking, in accordance with the IEE Regulations 528-1. On vertical runs of trunking internal incombustible barriers shall be fitted at the distance between floors or 5m, whichever is the less, in accordance with IEE Regulations 523-6.

All necessary trunking support work, hangers, brackets and fixing requirements shall be provided by the electrical Sub-Sub-Contractor.

Earth links of the appropriate size and type shall be installed at every jointing coupling, manufactured bend, etc., throughout the entire trunking system. Where trunking is used to provide a protective conductor it shall comply with the requirements of Chapter 54 of the IEE Regulations, particularly Section 543; alternatively, a separate protective conductor shall be installed in the trunking to comply with section 543 of the IEE Regulations.

In cases where sheet steel trunking is installed and there is danger of movement, a flexible earth conductor shall be installed bonding all joints in the trunking. This shall be fitted in addition to the standard earth links. Cable retaining strips shall be fitted at 1 m intervals. Insulated cable support pins shall be fitted at intervals of 4 m in vertical runs of trunking and at the top of the vertical trunking.

5 CABLE TRAYS

Cable trays shall be formed from perforated steel of not less than 0.9 mm thickness up to and including 100 mm width - 1.25 mm thickness from 150 mm up to and including 300 mm width - and 2.00 mm thickness above 300 mm width. They shall be galvanised unless otherwise specified. Tray shall be adequately sized to support the cable without bunching.

Support shall be by means of steel brackets installed at intervals necessary to provide a rigid fixing and ensure that no undue deflection occurs in the complete installation. The brackets shall be galvanised prior to fixing. Dome-headed bolts, nuts and washers of finish suitable to the tray shall be used between tray and brackets.

Fixing to the surfaces of walls, ceilings, etc. shall be by means of expansion-type masonry plugs or bolts. Fixings shall be galvanised unless otherwise stated. Cable trays shall be installed using factory-formed bends, elbows, tees, couplers and risers etc. Site fabrication of elbows etc., will only be permitted with prior approval of the Engineer and where it is not possible to obtain the necessary factory-made item.

Where cuts have been made, the tray shall be painted with zinc rich paint.

Holes which have been cut to allow cables to pass through shall be suitably bushed.

Suspension sets shall comprise threaded M12 cadmium plated hanger rods together with nuts and locking washers, vertical hanger brackets, support channel, tray hold-down clips etc., all of which shall have a galvanised finish.

All cables shall be securely fixed to traywork and the complete installation must be carried out in a neat and workmanlike manner without crossovers. A 25% reserve margin in size and weight shall be allowed for all cable tray works.

Cables of 30 mm diameter and above shall be fixed using the appropriate size cable straps of approved manufacture.

On light duty multi-cable runs, cable straps of plastic coated metal shall be used to secure cables. Bunching of cables will not be permitted.

Cables shall be clipped by means of copper or brass saddles and clips where high temperature or humid conditions are likely to be experienced. In all cases, saddles, clips, straps, etc., shall be fixed to the tray by means of brass screws or bolts and nuts.

6. PROTECTION OF PVC/SWA/PVC CABLES

6.01 General

Cable routing shall be such that the maximum degree of protection against accidental damage is obtained by running cables along the inside of channels and beams, etc.

Cables shall be laid in performed trenches or duct throughout all paved areas. Ducts shall be installed for underground cables before the paving is constructed.

Cable ducts shall be sealed at both ends using materials which are resistant to any likely corrosive and insect attack in the area concerned.

All cables rising through floors and trench covers, except in switch rooms, shall be protected by a length of steel pipe which shall project at least 150 mm above the finished surface level.

The open end of the pipe shall be sealed with a suitable compound. Care must be taken that all phases of single core cables pass through the same protective steel duct.

6.02 Cables Direct in Ground

All excavation and backfilling of cable trenches will be carried out by the main Sub-Contractor unless otherwise specified, but the electrical Sub-Sub-Contractor shall in any case make sure that trenches are made to a depth as specified.

The electrical Sub-Sub-Contractor shall lay cables direct in the ground in the following manner:-

75 mm (3 inches) of dry fine sand shall be placed to form a bed for the cables. After cables have been laid they shall be covered with additional dry fine sand well punned over and around the cables to a level of 75 mm above the top of the uppermost cable. Mechanical punners shall not be used for this work. The electrical Sub-Sub-Contractor shall supply and install concrete cable tiles which shall be carefully placed over the cable forming each circuit.

Until all the cables have been laid in the trench and have been covered with their protective tiles, no sharp metal tools such as spades or fencing stakes, shall be used in the trench. Rollers used during laying of cables shall have no sharp projecting parts liable to damage the cables.

6.03 Cables above Ground

For main cable runs the cable shall be run on approved tray or ladder rack, and secured to it at intervals of not more than 400 mm horizontally and 600 mm vertically.

Cables shall be dressed together and fixed with a common saddle. If the number of cables is such as to require the tiering of cables, the number of tiers shall generally be two.

7. TERMINATION OF CABLES

Cables shall be terminated in accordance with Chapter 52 of the IEE Regulations, particularly Section 527.

Cables shall be terminated by one of the following methods:-

- (i) The cable conductors shall be sweated into lugs of the appropriate size for the cable and equipment terminal.

- (ii) The cable conductors shall be secured by compression type lugs of the correct size for the cable and equipment terminal.
- (iii) The cable conductors shall be secured in pinch screw terminals.
- (iv) The cable shall be secured by means of clamps.

Where cables are required to terminate at connectors, as at lighting points, such connectors shall secure all the strands of stranded cables. Care shall be taken to ensure that cables are not damaged during preparation for termination.

Cables terminating at pinch screw terminals shall be twisted together and single cables shall have the conductor doubled back to ensure adequate purchase for pinching screws.

Cables connected to lamp holders or other components at which heat is produced shall be insulated with heat resisting material capable of withstanding, without detriment, the temperature encountered.

All terminations on PVC/SWA/PVC insulated cables shall be by compression type glands of an approved design and manufacture with facilities for clamping the armouring the outer sheath of the cable.

Glands mounted outdoors shall incorporate a seal to prevent ingress of moisture into the gland, and all glands shall be fitted with a thermoplastic shroud.

Where circular terminations are to be made, these shall be completed using Ross Counterney terminals.

Where cables are terminated in "Klippon" type terminals with parallel faced jaws, the individual cores shall be terminated using the appropriate flat or hook blade crimped lugs. Where the terminal faces are concaved, the cores shall be terminated in wires pin crimped lugs.

The electrical Sub-Sub-Contractor shall avoid multiple connections under one screw or one pin. Where more than two wires are required, a common termination jumper bar shall be used.

Terminals shall be mounted on rails or supports. All internal wiring is to be clearly marked by markers.

8 SEGREGATION OF SERVICES

Cables of differing voltages shall be segregated so that there is no possibility of a fault in a power cable damaging any adjacent cables or imposing a different voltage upon them.

9 IDENTIFICATION OF CABLES

All cables shall be fitted with non-corrosive cable identification bands at each end, and at all changes of direction where they leave a group of cables. All cables cores connected to equipment having marked terminals shall be fitted with non-corrosive identification bands bearing markings corresponding to those of the terminals at both ends.

10. EARTHING

The whole of the metallic portion of the installation, other than current carrying parts, shall be electrically and mechanically bonded to the consumer's main earth terminal and also if applicable, to the lighting protection system or other points specified.

The installation shall be earthed in accordance with the Sixteenth Edition of the Regulations for Electrical Installation issued by the IEE, BS CP1013, "Earthing" and BS 6651 'The protection of structures against Lightning'. The electrical Sub-Sub-Contractor's attention is drawn to Chapter 54 of the IEE Regulations.

A main earth terminal shall be supplied and installed adjacent to the electricity supply cable termination. The terminal shall be of ample size and capacity to suit the installation. All items of equipment, switchgear, etc., shall be bonded to this earth terminal using PVC insulated PVC sheathed cables, coloured green and yellow and sized in accordance with Tables 41A1 of the IEE Regulations. An invorine label reading **"SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE"** in engraved upper case characters not less than 4.75mm high, shall be permanently fixed immediately adjacent to or on the earth terminal.

A heavy duty copper clamp complying with BS. 951 shall be used to bond the main protective conductor to the electricity supply cable armouring or metallic sheath (where applicable the armouring and sheath shall be bonded together).

All protective conductors shall, where possible, be enclosed within metal trunking or conduit serving switchgear, distribution board etc., so as to provide mechanical protection. Where protective conductors are run on building surfaces they shall be properly fixed and supported by means of PVC coated metal saddles along selected routes.

Earth continuity between separate items of switchgear, distribution boards etc., mounted adjacent to one another shall be affected by means of high conductivity continuous copper tape, or PVC sheathed cable, coloured green and yellow, and sized in accordance with the Table 41A1 or 41A2 and Section 543 of the IEE Regulations, connecting all items to the earth terminal.

All items of switchgear, accessories, luminaries, conduits, and the outer sheaths of MICS cables, the armouring of all PVC/SWA/PVC cables together with all other items of electrical plant and equipment shall be effectively earthed by means of a protective conductor in accordance with Table 41A1 and 41A2 and section 543 of the IEE Regulations.

At every terminal point on the fixed wiring an integral earth terminal shall be provided e.g. BESA boxes, accessory boxes etc. A protective conductor shall be provided and installed between this terminal and the earth terminal on the associated switch, socket outlet, luminaire etc.

Each circuit protective conductor shall be connected to a multi-way earth terminal provided and fixed within each distribution board. The earth terminal shall be provided with an adequate number of ways such that not more than one conductor per terminal shall be installed and the earthing conductors shall be connected in the same sequence as the current carrying conductors.

All metal piped services, e.g., Heating, Water and Gas Services, metal wastes and piped services at sinks, baths and showers etc., shall be bonded to the earth terminal in accordance with the IEE Regulations 413-2.

A 50mm section of each gas and water pipe, at position close to their entry into the relevant building, shall be cleaned and made smooth. A copper earthing clamp designed to permit the connection of protective conductors shall be provided and sized in accordance with Table 41A1 and 41A2 and Section 543 of the IEE Regulations.

The clamp shall be a proprietary type or shall be fabricated from high conductivity copper strip, minimum size 40 mm x 4 mm which shall encircle the cleaned sections of the pipe. A permanent label indelibly marked with the words, "**SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE**" in legible type not less than 4.75 mm high, shall be permanently fixed at the points of connections.

The final connection of bonding conductors from gas, water pipes and other services to the earthing terminal shall not be completed until earth electrode and earth impedance tests have been satisfactorily completed.

Bonding connections to pipework shall be as unobstructive as possible where practicable shall be made in service ducts or accessible voids and shall be readily on the Record Drawings. All materials and sundry item shall be provided whether or not specifically mentioned, necessary to completely and effectively earth the installation. The installation shall be fully protected against dampness and corrosion and the effect of electrolytic action between dissimilar materials. A completely permanent installation shall be provided which shall be fully accessible for regular testing and inspection.

The value of earth resistance from any point of an installation to the general mass of earth shall be low enough to ensure operation of circuit protective devices and shall in any case not exceed four(4) ohms for electrical equipment, seven (7) ohms for lighting protection. Each earthing cable shall terminate in an approved design of cable lug.

Where earth conductors are run upon structures or walls they shall be fastened by means of heavy gauge non-ferrous fasteners not more than 0.75 m apart on horizontal runs and not more than 1.2 m apart on vertical runs and to give a minimum clearance of 4 mm from the fixing face.

In the event of the electrical sub-Sub-Contractor not being able to establish a suitable earth connection to the electricity supply cable, earth electrodes shall be installed which shall be galvanised or copper clad steel extendable rods not less than 16 mm diameter and not less than 1.2 m in length. Connections to electrodes shall be made by means of solderless mechanical clamps.

To avoid corrosion, all earth system connections shall be cleaned bright and immediately covered with silicon MS4 compound or approved equal.

Earth pits, where required, shall be in accordance with the Sub-Contractor's relevant drawings, with the facility to disconnect the earth ring while measuring the electrode earth resistance.

11

FUSED-SWITCH UNITS, SWITCHFUSES AND ISOLATORS

The above units comply with BS 5419 and shall be 500 volt type and installed where specified and indicated on the relevant drawings.

All switchgear shall be provided with suitable locks for padlocking the switches in the 'OFF' position. The cover shall be interlocked with the operating mechanism to prevent it from being opened in the 'ON' position. This interlocking shall also prevent the switch from being closed with the cover open unless for maintenance purposes. The cover shall be gasketed to prevent ingress of dust.

The switch action mechanism shall be of the parallel operation (double break type having cartridge fuses mounted switches) and shall be ASTA certified to meet adequately all the duties specified.

The end plates shall be removable for drilling for conduit or cable entry and shall be fitted with additional distance pieces where necessary. Switchgear boards shall be fixed to the wall/floor by Rawl bolts or other approved fixings.

No building alteration shall be allowed when moving the switchboard into position, the switchboard being supplied in sections to be built in position, if so required.

Switchgear shall be delivered to site when required to suit the progress of the works. Care shall be taken to preserve the manufacturer's paint finish. Any refurbishing etc. shall be carried out, using paint obtained from the switchboard manufacturer, to the original standard of finish.

All fuses in switchgear shall be HRC fuses sized for the fused-switch units or switch-fuses etc., in which they are incorporated. They shall be ASTA certified for compliance with BS 88, Category of Duty 440 A.C 5 Class 01 and in all cases fuse links shall be selected to provide circuits discrimination.

12 CONTROL PANELS AND CUBICLES

The details specified in clause 4.11 shall apply as far as fused switches, bus-bars and rating etc are concerned. The panels shall be constructed from rolled steel channel minimum size 60 mm x 30 mm deep x 5 mm or equivalent angle section clad with sheet steel of 3 mm gauge. 2 mm gauge may be used for covers and doors of not more than 1 m square.

Terminals shall be of the "Klippon" standards rail-mounted feed-through type or approved equal. All terminals shall be identified by means of numbered or lettered marking tags, which shall be identical to the number of letter applied to the cables. Cables shall be identified as terminations by means of cable markers as manufactured by "Klippon" or approved equal. 25% spare terminals capacity within wiring duct shall be provided. All components motors, starters, relays, timers, etc. shall be labelled showing their reference and function and these shall relate to the panels' schematic wiring diagram provided with the "As-built" drawing and manuals.

All control panels shall be fitted with multi-pole isolating switches through which all electricity supplies shall pass. The door(s) of the control panel shall not open unless the isolating switch is in the "off" position. A facility to lock the control panel-isolating switch in the "off" position shall be included.

13 DISTRIBUTION BOARDS

13.1 General

All distribution boards, unless stated otherwise, shall be miniature Circuit Breaker Distribution Boards and shall be of surface or flush type, as specified. Facilities for local isolation of the distribution boards shall be provided by either a local fused-switch unit or an integral isolating switch, whichever is specified.

Where surface mounted on a flush installation, all conductors shall terminate behind the board in an adequate box. For surface mounting, trunking shall be fixed between the board and ceiling level, or conduits run directly into the board. Adequate earth continuity connection shall be made between the various components.

13.2 Fused Distribution Boards

All fuse boards shall be of 500 volt rating to BS. 5486 part 11 "Particular requirements for Fuse boards". The details specified in clause 4.12 shall apply as far as cabinet and construction, cabling arrangements, bus bars, neutral bars, earthing and isolating switches are connected.

Fuse banks shall be spaced so as to obviate the necessity for insulating barriers, but protection shall be provided by means of insulating shields to prevent accidental contact with the main bus bars and connections.

All fuses lighting and heating circuits shall be of the HRC cartridge type, ASTA certified, for compliance with BS. 88, category of Duty 440 A.C 5 class 01.

13.3 Miniature Circuit-Breaker Distribution Boards

MCB distribution boards shall comply with BS. 5486 part 12 'Particular requirements for miniature circuits-breaker boards'. The cases shall be constructed of heavy gauge sheet steel, in such a manner as to afford rigidity and maximum ease of wiring for full size circuit and main cables.

The cover shall be provided with an efficient gasket or alternatively designed with generous overlapping edges to prevent the ingress of dust. Components shall not be manufactured from zinc alloy in conjunction with sheet steel where they are relied upon for earth continuity.

Where the cover is required to be lockable, cylinder type locks shall be provided, having two keys per lock. All locked distribution boards shall be handed to the Engineering Supervisor on completion of the works. The cases shall be provided with detachable cable/conduit terminating plates, which shall be reversible and interchangeable from top to bottom.

All screws and nuts used in the construction of the case shall be fitted with shake proof washers and care taken to ensure efficient earth continuity. An external earthing terminal with cable socket shall be fitted.

All MCB banks shall be fitted to frames, with robust locking plates provided to ensure the frames rigidly in the fixed position.

The banks shall be so spaced to obviate the necessity for insulating barriers, but protection shall be provided by means of insulating shields to prevent accidental contact with main bus bars and incoming mains cable.

Bus-bars shall be of high conductivity, hard drawn copper conductors connected to the MCB contacts by means of spring washered screws or bolts, unless plug-in type MCBs are specified.

Neutral bars shall be similar to the main bus bars and shall have two screw terminals per way for rating of 30 amps or over. Single screw connections will be allowed for capacities up to 30 amps. The neutral bars shall have one terminal for each MCB within the board, and connection of conductors to the neutral bar shall be in the same order as the MCB ways.

Where installations are carried out with cables with a protective conductor, all distribution boards shall also contain internal earthing bars similar to the neutral bars detailed above, with one terminal for each MCB within the board. Earthing conductors shall be connected in the manner described for neutral conductors to neutral bars.

Where a main integral isolating switch is provided in an MCB case it shall be arranged to isolate incoming live and neutral main cables from the bus-bars. The isolator switch shall be rated at 500 volts and of the quick make-and break pattern with positive action. Incoming and outgoing terminals shall be fitted with two clamping screws and outgoing conductors to the bus-bars shall be high conductivity hard drawn copper rods.

Isolating switches shall comply with IEE Regulations, Part 537, and shall be capable of carrying their full rated load continuously and shall 'make' or 'break' their full rated load without undue burning of the contacts.

13.4 Miniature Circuits Breaker (MCB)

All MCBs shall have movements which are positive in both directions (make and break) so as to enable units to be closed decisively by the operation of the handle, and to be able to assume the 'OFF' position unless the contacts are definitely separated, to safeguard against false indications.

The handle shall be trip free to make it impossible for the operator to hold the breaker in the closed position under faulty conditions. The operating mechanism and arc chambers of the circuit breaker shall be separated from the terminals and fixing screws.

Terminal identification shall be readily discernable as viewed from the front of the board with automatic and clear signal identification for both 'ON' and 'OFF' position.

All terminals shall be readily accessible from the front and each wiring chamber shall be closed by a screw fixed cover which protects the terminals and prevents dust from settling on the insulation.'

Where the full capacity of a distribution board is not required the electrical Sub-Sub-Contractor shall fix blanking plates in the vacant MCB housings. All MCBs shall be rated at 500 volts minimum, and comply with BS 3871. "Miniature and moulded case circuits breakers" and 4752 part 1, "Circuit breakers".

13.5 Moulded Case Circuit Breakers (MCCB)

Where specified, MCCBs shall be of the thermal/magnetic type, having a quick make, quick break, trip free mechanism which prevents the MCCB from being closed or held against short circuits or overloads. Tripping of every multi-pole MCCB shall be such that operation ensures simultaneous action in all phases.

Clear indication shall be provided for the three positions of operation of the mechanism - 'ON', 'OFF' and 'TRIPPED'. The operation shall be such that the MCCB shall trip automatically under fault conditions and, to reset, the handle shall require first moving through the 'off' position. All MCCBs shall be provided with facilities for locking the breaker in 'OFF' position.

All MCCBs shall be rated at 500 volts minimum, be ASTA certified for this operational duty, and comply with BS. 3871 and BS. 4752 Part 1.

14 LABELLING AND ENGRAVING

14.1 Labelling

All fused-switch units, switch-fuses, switches, bus-bars chambers, distribution boards etc., and all items of equipment on the main panel shall be identified in accordance with section 514 of the IEE Regulations and shall have securely fitted externally a white 'Traffolyte', 'Formica' or other approved plastic laminate label engraved with 6 mm high black letters detailing the function of the equipment and any reference number.

Red, yellow, blue, plastic laminate phase discs shall be fixed inside all switchgear and distribution boards to indicate to which phase of the supply the various circuits are connected. The colourings shall comply with Part 524 of the IEE Regulations.

Each TP or TP & N item of switchgear shall have fitted on the cover a white plastic laminate label having 'CAUTION' - 415 VOLTS' engraved in 10 mm high red lettering.

5.2 Engraving

The electrical Sub-Sub-Contractor shall allow for engraving of all switched fused spurs, double pole switch accessories and any other accessories, which are customarily required.

The accessory plate shall be engraved in either black or red, capital letters 5 mm high, detailing and appliance or equipment being supplied by the accessory e.g., 'WATER PUMP' etc.

15 MOUNTING HEIGHTS

The approximate position of main switchgear, control equipment distribution boards, fittings and accessories shall be as indicated on the Drawings. Actual positions shall be determined on site by the Engineer.

Unless otherwise stated on the relevant drawings or directed by the Engineer the following mounting heights of all accessories above finished floor level shall be adhered to: -

Lighting Switches **1400 mm to centre**

Socket Outlet and Spur **300 mm to centre (or 150 mm above work top level to centre)**

Distribution Boards **1800 mm to lower edges.**

All groups of accessories shall be in line either vertically or horizontally or as specified.

16 LUMINAIRES

All Luminaires shall be of the manufacture, size and type specified and shall comply in all respects to BS 4533 "Electric Luminaires".

The electrical Sub-Sub-Contractor shall supply and install all luminaires including lamps, lamp- holders, control gear, capacitors, glassware, diffusers or other attachments, heat resistant internal cables, fuses and terminals and all necessary suspension gear. In case where Luminaires are supplied by the client the Sub-Sub-Contractor shall deliver to site store, install, commission and set to work.

Unless otherwise stated, Luminaires shall be suitable for Class 1 normal indoor environments, giving a degree of protection against ingress of moisture or dust.

All Luminaires shall be assembled and installed in accordance with the respective manufacturer's instructions/recommendations, in the position and mounting heights specified.

Luminaires shall not be installed under dirty and hazardous site conditions, and any damage or deterioration to luminaires installed under these conditions shall be made good by the electrical Sub-Sub-Contractor.

The Luminaires shall be cleaned free of dust and dirt after completion of the installation. Where dirt, dust, corrosion or other conditions cause imperfections in the luminaires, they shall be replaced.

Luminaires, diffusers, attachments or glassware etc., shall be properly stored to final erection, in such a manner as to avoid damage of any kind.

Luminaires fixings shall generally be suitable for direct connection to conduit boxes or as otherwise specified. Luminaires not provided with suitable BESA box shall be modified as necessary.

Where a flexible cord supports, or partly supports, a luminaire the maximum mass supported by the cord shall not exceed the values set out in IEE Regulations 523-32.

The minimum cross-section area flexible core to the employed shall be 0.75mm².

Specified attention shall be given to Chapter 52 of the IEE Regulations, particularly Regulation 521-5 and 521-6, Appendices 9 and 10.

Pendant tungsten luminaires shall be fitted with heat resistant flexible cord complying with BS 6500, capable of continuous operation with a conductor temperature of 150 degrees C. The cable shall be of the circular multicore type, finished white, if not otherwise specified.

Ceiling mounted tungsten luminaires, spotlights and other luminaires of the category 'hot' luminaires shall be wired internally with cable suitable for continuous operation at 185 degree C. Where cable tails are provided they shall be of the heat resistant type capable of operation at 185 degree C.

Exterior luminaires, fixed to the walls of buildings etc., shall be wired such that final circuit wiring terminates within the luminaire. All final circuit cables so installed shall be provided with heat resistant sleeves from the connection point within the luminaire for a distance of 300 mm.

All fluorescent and other discharge luminaires shall be provided with an integral fused connector block. The rating of the fuse shall be in accordance with the manufacturer's instructions to protect the internal wiring of the luminaire and to provide discrimination between final circuit protection and luminaire protection.

All recessed and semi-recessed luminaires in ceilings shall be connected by three core 0.75 mm² high temperature flexible cord from the terminals of the luminaires to a plug-in ceiling rose fixed and connected to an accessible outlet box in the wiring system, within the suspended ceiling immediately above the luminaire. The ceiling rose shall be accessible via the opening provided in the ceiling.

The electrical Sub-Sub-Contractor shall ensure that the methods of suspension for luminaires are electrically and mechanically sound.

Luminaires suspended by means of tubes shall be fitted to ball joints allowing a swing of at least 20 degrees all round. Reliable earthing between the fixed and moving parts shall be provided by means of a flexible braided copper tape.

Fluorescent luminaires shall be provided with a minimum of two fixings, except in the case of recessed modular luminaires or surface-mounted luminaires exceeding 300 mm in width, where four number fixings (one from each corner) shall be provided by means of conduit drops or threaded rods.

Normally visible luminaires support shall be conduit. All fluorescent luminaires shall be solidly mounted with all assembly nuts, bolts and accessories made tight to prevent vibrations and noise. Anti-vibration packing shall be fitted where necessary. luminaires mounted direct to trunking shall be fixed by means of the manufacturer's recommended fixing assemblies.

Unless stated otherwise, all luminaire supports shall be fixed to the building primary structure. Luminaires shall not be supported from suspended ceiling unless otherwise specified. The electrical Sub-Sub-Contractor shall be responsible for mounting and fixing arrangements.

Break joint rings of approved colour shall be provided for all suspended luminaires and fluorescent battery luminaires where the batten is of insufficient width to cover completely the conduit box and its associated clearance hole in the ceiling.

The metalwork of all luminaires shall be effectively bonded to the earthing system in accordance with Chapter 54 of the IEE Regulations.

Care shall be taken to ensure that the internal wiring of luminaires and the cable of any fixed wiring shall not be in contact with high temperature areas in luminaires.

Lighting track shall be of the type, size, finish, number of circuits and manufacture specified and shall comply with the requirements of the relevant section of BS. 4533. The positions of luminaires as shown on the Drawings are approximate only and exact position shall be determined after reference to the Engineering supervisor.

18. CEILING ROSES

Surface mounted ceiling roses shall be of all insulated, high impact moulded plastic construction complying with BS. 67 and shall be suitable for direct attachment to conduit outlet boxes.

Recessed or semi-recessed ceiling roses shall be manufactured from porcelain. Break joint rings shall be provided when used on flush conduit outlet boxes.

Ceiling roses shall not be connected to fixed wiring in such a manner that one of the terminals remains 'live' when

the associated switch is in the 'off' position, unless that terminal is inaccessible to touch when the ceiling rose cover is removed, e.g. for replacement flexible cord.

Terminals shall be provided for switched live, neutral and protective conductors. Loop-in facilities shall also be provided.

19 LAMPS

Lamps shall be compatible with the luminaire for which they are intended and shall be of the wattage, type and colour specified. Lamps shall be of the correct voltage rating for the particular electricity supply concerned.

Tungsten filament lamps, unless otherwise specified, shall be of the 'PEARL' type and of the long- life type giving 2000 hours average life.

Luminaires designed to accommodate lamps with reduced physical dimensions shall be fitted with lamps of the mushroom type of approved equal.

20 EXTERNAL LIGHTING

External lighting system shall comprise the lighting points at the position shown on the Drawings and shall include the provision, erection and connection of all lighting columns, bollards, wall and ceiling luminaires and the provision and connection of all control gear together with the laying, jointing and connection of all necessary cables.

All excavation, trenching, backfilling etc., will be undertaken by the main Sub-Contractor.

All lighting columns shall be of the type specified, suitable for looping in and out three No.2 Core PVC/SWA/PVC cables of the specified size.

Where discharge lamps are specified the associated controlgear shall be mounted in the base of the column above the fused 'cut out', all on a timber board housed within the base of the column.

Each lighting column/bollard shall be completed with all adaptors, spigots, mounting brackets, luminaires, controlgear and lamps and shall be provided with a base compartment and locking door.

All column/bollards shall be fixed in the position specified.

Cable routes are shown on the relevant drawings and the electric Sub-Sub-Contractor shall lay the lighting cables in the trenches.

All connections shall be made in an approved manner, and the installations shall be finished complete and handed over in working order to the full satisfaction of the Engineer.

21 LIGHTING SWITCHES

Lighting switches shall be of the type, size and manufacture as specified.

Wall and ceiling switches shall comply with BS 3676. Wall and ceiling switches controlling A.C lighting circuits shall be rated 20 amp and be of the slow break quick make, type unless stated otherwise.

Where several switches on one phase are shown at one position, a ganged box shall be used.

Where switches at any location are connected to different phases, purpose-make phase barrier switches shall be installed. The phases shall be separated by means of rigidly fixed barriers and the cable for each phase shall be confined to the area enclosed by the barriers for that phase.

Switches connected to a particular phase shall have separate cover or covers fitted over each phase. The covers shall be engraved "CAUTION 415 VOLTS".

The switch plate of the specified finish shall be fitted over phase covers to render the switch unit indistinguishable from the switches that are not phase barrier switches.

Alternatively, each gang shall have its own piping and box for each phase, physically separated from other phases with similar arrangements.

For flush position on a plastered or equivalent finish wall, the switches shall have overlapping plates.

In any places where the finish is fair-faced brickwork, the wiring shall be installed on the back of the wall and

make a back entry into the accessories. Each switch in these areas shall be neatly recessed and incorporate an overlapping plate.

For surface-mounted positions and such Plant Rooms, Electrical Switch room etc., employing a surface-mounted system or wiring, switches shall be surface-mounted, having metal front plates of an aluminium finish, mounted in matching metal boxes.

22 SOCKETS OUTLETS

All socket outlets and plugs shall be supplied and installed in accordance with the manufacture, type, sizes and finish specified.

All round pin 2A, 5A, 15A, and 30A socket outlets shall comply with the requirements of BS 546. All sockets outlets shall be switched, unless otherwise specified.

All switched sockets outlets shall be complete with steel boxes of the same manufacture, complete with earth terminal.

Assemblies shall comply fully with the requirements of the IEE Regulations concerning the bonding of protective conductor terminals and each such terminal shall be connected by a conductor, having a minimum cross-sectional area of 2.5 mm², to a permanent earthing terminal incorporated in the associated box providing an effective, solid connection to the earth continuity conductor of the installation.

Where the assembly does not provide a reliable electrical contact between the cover plate and box with effective connection of metal operating bars and toggles, then an insulated earthing lead shall be provided, solidly connected to the metal plate and operating bar or toggle and terminating at the fixed earthing terminal incorporated in the associated box. 13 amp sockets will generally be installed using ring circuits in accordance with Appendix 5, Table 5A of the IEE Regulations.

All plugs shall be of moulded rubber or other resilient material complying with BS 1363 or BS 546. The plug shall have internal cord grip. 13 amp plugs shall be fitted with cartridge fuse links to BS 1362. The fuse rating shall be selected to give protection to the flexible cord or cable connected.

All fuses installed within 13 amp plug top, fused spurs, clock connections etc., shall be cartridge fuse links rated at 240 volts, ASTA certified for compliance with BS 1362 'General purpose fuse links for domestic and similar purposes', or BS 464 'Cartridge fuse links (rated at up to 5 amperes) for AC and DC service', or BS 2950 'Cartridge fuse-link for telecommunications and light electrical apparatus'.

All equipment, which is locally fused, shall have fitted fuses with characteristics, which are recommended by the manufacturer of the equipment.

If any appliance or equipment suffers due to incorrect fusing of the appliances, such appliances or equipment shall be repaired or replaced at the electrical Sub-Sub-Contractor's cost, to the satisfaction of the Engineer.

23 INSPECTION AND TESTING

A visual inspection shall be made in accordance with IEE Regulations 612-1. References shall be made to appendix 14 of the IEE Regulations, which is a checklist for initial inspection of installations.

The electrical installation shall be inspected and tested by the electrical Sub-Sub-Contractor in accordance with part 6 of the IEE Regulations.

Where any part of installation is to be concealed within a building, fabric tests shall be made to ensure that the installation is satisfactory prior to concealment.

Upon completion of the works the whole installation shall be subjected to the tests detailed hereafter and every defect shall be noted, corrected and brought to the notice of the Engineer.

All tests shall be witnessed by the Engineer to his full satisfaction and he shall be given at least one week's notice in writing of the proposed tests.

All labour and test instruments shall be provided by the electrical Sub-Sub-Contractor and the instruments shall be correctly calibrated and certified for the limits of accuracy required and shall be operated by competent person. If, in the Engineer's opinion, a particular instrument is not suitable, then an acceptable alternative shall be provided. The Engineer shall be at liberty to demand the use of any testing instrument or apparatus that he may reasonably consider to be necessary in the execution of the testing.

In the event of the installation failing to pass the test, the Engineer has the full authority of the Employer to deduct from the Contract Price all reasonable expenses incurred, due to him being required to attend a

repetition of the test.

The following items, where relevant, shall be tested in the sequence indicated. Standard methods of testing, in respect of some of the following regulations of this section, are given in Appendix 15 of the IEE Regulations.

- i) Continuity of ring final circuit conductors.
- ii) Continuity of protective conductors, including main supplementary equipotential bonding.
- iii) Earth electrode resistance.
- iv) Insulation resistance.
- v) Insulation of site-built assemblies.
- vi) Protection of barriers or enclosures provided during erection.
- vii) Insulation of non-conducting floors and walls.
- viii) Polarity.
- ix) Earth fault loop impedance.
- x) Operation of residual current devices and fault voltage operated protected devices.

Upon completion of all tests and commissioning, two copies of detailed certificates shall be provided by the electrical Sub-Contractor to show that the equipment, materials, installation etc., have been tested and commissioned. One copy of each, duly completed and signed shall be submitted to the Engineer within 154 days of the results being obtained. The second copy of the certificates shall be retained to be included with operator and maintenance manuals.

The results of the test and details of completion for the electrical test shall be detailed on the Test and Completion Certificates respectively; issued by the National Inspection council for Electrical Installation Contracting or other approved authority.

SPECIFICATIONS FOR PLUMBING AND DRAINAGE

General

This section specifies the general requirements for plumbing and drainage forming part of the Sub-Contract Works and shall apply except where specifically stated elsewhere in the specification or on the contract Drawings.

3 Pipework and Fittings

Pipework materials to be used are as follows: -

3.1 Cold Water Mains

Unplasticised PVC or galvanized steel medium or heavy grade, as specified on the drawings.

3.2 Black Steel Pipework

All black steel pipework up to 65mm nominal bore shall be manufactured in accordance with BS 1387 Medium Grade, with tempered place threads in accordance with BS 21. All fittings shall be malleable iron and manufactured in accordance with BS 143.

Pipe joints shall be screwed and socketed and sufficient coupling unions shall be allowed so that fittings can be disconnected without cutting the pipe. Running nipples and long screws shall not be permitted unless exceptionally approved by the Engineer

All black steel pipeworks, 80mm nominal bore up to 150mm nominal bore, shall be manufactured to comply in all respects with the specification for 65mm pipe, except that screwed and bolted flanges shall replace union and coupling for the joint of pipes to valves other items of plant.

All flanges shall comply with the requirements of BS 10 to the relevant classification contained hereinafter under section C of the Specification.

3.3 Galvanized Steel Pipework

Galvanized Steel pipework shall be manufactured to comply in all respects with the standards described for black Steel pipework in paragraph 3.2 above.

Galvanizing shall be carried out in accordance with the requirements of BS 1387 and BS 143 respectively.

3.4 Copper Tubing

All copper tubing shall be manufactured in accordance with BS 2871 from C.160 'Phosphorous De-oxidized Non-Arsenical Copper' in accordance with BS 1172.

Pipe joints shall be made with soldered capillary fittings and connections to equipment shall be with compression fittings manufactured in accordance with BS 864.

Short copper connection tubes between galvanized pipework and sanitary fitments shall not be used because of the risk of galvanic action.

If, as may occur in certain circumstances, it is not possible to make the connection in any way than the use of copper tubing, then a brass straight connector shall be positioned between the galvanized pipe and the copper tube in order to prevent direct contact.

3.5 Cast Iron Pipework

a) Internal Services

Cast Iron pipework and fittings for use above ground in connection with internal building services, shall be manufactured with spigot and socket joints of the weight required by the local authority and shall fully comply with the requirements of BS 416.

All joints on Cast Iron spigot and socket pipes shall be made with an approved cold caulking compound and so installed as to allow for any expansion or contraction, which may take place.

All Cast Iron pipe work, branches, tees bends and other fittings shall be supplied complete with inspection covers for cleaning purposes. These inspection covers shall be included as parts of the fittings and shall comply with requirements of BS 416.

b) External Services

Cast iron pipe work, which is used in connection with buried external services, shall be manufactured, coated and tested in accordance with the requirements of BS 1211

All buried cast iron bends, elbows swept tees and other fittings, shall comply with the requirements of BS 1130.

Joining on external cast iron pipes shall be carried out in accordance with one of the methods described in BS Code of Practice 301, Clause 505C (v), to the approval of the Engineer.

3.6 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 BS 2760. Pipes shall be connected by means of purpose tapered joints manufactured in accordance with the requirements of the notes contained under Appendix C of BS 2760.

Until such a time as the use of pitch impregnated fibre is covered by a code of practice, the jointing, laying and cutting of these pipes shall be carried out in accordance with the requirements of the notes contained under appendix C of BS 2760.

3.7 Concrete Pipe

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

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

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

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

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

3.8 Asbestos Cement Pressure Pipe

Where asbestos cement pressure pipes and fittings are used in connection with external, above ground or buried water services, they shall be manufactured in accordance with the requirement of BS 486.

The classification of these pipes fall into classes:

A, B, C and D, respectively, and the class to be used shall depend upon the pressure conditions pertaining to site. Where Cast iron detachable joints are used for connecting pipes, the material shall comply with the BS specification, then the materials used shall be of quality not less than that required by this standard.

Rubber jointing rings shall be used for sealing purposes and shall comply with requirements of BS 2494, except where they are likely to be contaminated by oil products, in which case the gasket shall be manufactured in accordance with BS 3514.

3.9 PVC (Hard) Pressure Pipes and Fittings

All PVC pipes and fittings shall be manufactured in accordance with BS 3505: 1968 or the relevant Kenya Standard.

Jointing

The method of jointing to be employed shall be that of solvent welding, using the pipe and manufacturer's approved cement. Seal ring joint shall be introduced where it is necessary to accommodate thermal expansion.

Anchoring

The bends, valves and hydrant tees etc., in the line of the water main shall be adequately anchored to resist thrust due to internal water pressure. A concrete block shall be cast under and around the pipe and between it and sides of the trench. Well-rammed material shall be used to support the pipe and either side of the concrete.

Pipe Bed

Pipes shall be uniformly laid on a 75mm thick bed, (sand or red soil) and must not be allowed to rest on the joint or on stones etc.

Backfilling

For the protection of the pipe, initial backfilling shall be carried out as soon as possible after laying. The initial backfill shall be fine grained material thoroughly compacted around the pipe and consolidated to a depth of 6" above the crown of the pipe and at no time shall heavy rocks, stones or other objects be included in the balance of the backfill that might protrude the initial backfill layer and come into contact with the pipe.

Testing

Pipelines shall be tested in sections under an internal water pressure normally one and a half times the maximum allowable working pressure of the class of pipe used. Testing shall be carried out as soon as practical after laying and when the pipeline is adequately anchored. Precautions shall be taken to eliminate all air from the test section and to fill the pipe slowly to avoid risk of damage due to surge.

3.10 MuPVC Waste Systems

All pipes and fittings shall be manufactured in accordance with BS 5255: 1968 or the relevant Kenya Standard.

Pipe shall be supplied in plain-ended lengths.

Thickness

The Minimum acceptable wall thickness of pipe and fittings shall be as follows:

size(in)	Size (mm)	Pipe and Fittings Wall Thickness (mm)
1 □	32	1.8
1 □	40	1.9
2	50	2.0

Jointing

The method of joining to be employed shall be that of solvent welding, using the pipe and manufacturer's approved cement. Seal rings joints shall be introduced where it is necessary to accommodate thermal expansion.

Anchoring

All bends, valves and hydrant tees etc, in the line of water main shall be adequately anchored to resist thrust due to internal water pressure. A concrete block shall be cast under and around the pipe and between it and sides of the trench. Well-rammed material shall be used to support the pipe and either side of the concrete.

Workmanship

The installation method of jointing shall be solvent welding; and both jointing and fixing shall comply in all respect to the manufacturer's site-work instructions. The maximum intervals between pipe supports at 200c shall be as follows: -

Nominal size (in)	Nominal size (mm)	Horizontal (mm)	Vertical (mm)
1 □	32	500	1200
1 □	40	500	1200
2	50	900	2000
3	80	900	2000
4	100	1000	2000
6	150	1000	2000

Pipes shall be fixed in straight runs and horizontal runs and shall be laid to gradients in conformity with BS 5572 of Practice for Sanitary and in any event not less than 18mm/m unless otherwise specified.

Pipes passing through wall or floor shall be sleeved to allow unrestricted movements.

The works shall be inspected and tested during installation at any stage in accordance with BS 5572. All work, which will be concealed, shall be tested before it is finally enclosed and verified by the Clerk of Works.

Pipe Bed

Pipes shall uniformly be laid on a 75mm thick bed, (Sand or red soil) and not be allowed to rest on the joint or on stones etc.

Supports to Fittings

In underground installation care shall be taken to ensure that heavy components such as valves are fully supported so that the pipeline carries no weight.

Backfilling

For the protection of the pipe initial Backfilling shall be carried out as soon as possible after laying. The initial backfill shall be fine-grained material thoroughly compacted around the pipe and consolidated to depth of 6" above the crown of the pipe. At no time shall heavy rocks, stones or other object be included in the balance of the backfill that might protrude the initial backfill and come into contact with the pipe.

Testing

Pipelines shall be tested in section under an internal water pressure normally one and a half times the maximum allowable working pressure of the class pipe used. Testing shall be carried out as soon as practicable after laying and when the pipeline is anchored precautions shall be taken to eliminate all air from the test section and the pipe slowly to avoid risk of damage due to surge.

3.11 A.B.S. Waste System

Where indicated on the Drawings and Schedules, the Sub-contractor shall supply and fix A.B.S. waste pipes and fittings.

The pipes, traps and fittings shall be in accordance with the relevant British Standards, including BS 3943, and fixed generally in accordance with manufacturer's instructions and BS 5572: 1978.

Jointing of pipes shall be carried out by means of solvent welding, the manufacturer's instructions and BS 5572: 1978.

Jointing of pipes shall be carried out by means of solvent welding. The manufacturer's recommended method of joint preparation and fixing shall be followed.

Standard brackets, as supplied for use with this system, shall be used wherever possible. Where the

building structure renders this impracticable the Sub-contractor shall provide purpose made supports, centres of which shall not exceed one metre.

Expansion joints shall be provided as indicated. Supporting brackets and pipe clips shall be fixed on each side of these joints.

3.12 PVC Soil System

The Sub-contractor shall supply and fix PVC soil pipes and fittings as indicated on the Drawings and Schedules.

Pipes and fittings shall be in accordance with relevant British Standards, including BS 4514 and fixed to the manufacturer's instructions and BS 5572.

The soil system shall incorporate synthetic rubber gaskets as provided by the manufacturer whose fixing instructions shall be strictly adhered to.

Connections to WC pans shall be effected by the use of a WC connector, gasket and cover, fixed to suit pan outlet.

Suitable supporting brackets and pipe clips shall be at maximum of meter centers

The Sub- contractor shall be responsible for the joint into the Gully Trap on Drain Trap as indicated on the drawings.

3.13 UPVC Square Rainwater System pipe and Gutter

Gutter shall be a rectilinear section 116mm or 137mm

wide. Gutters shall be supplied in plain-ended lengths

The minimum acceptable wall thickness of gutter shall be 2.20mm

Rainwater pipes shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of rainwater pipes shall be 1.80mm Pipe support brackets must be adequate to screen expansion gaps.

The grade of UPVC used for gutter and pipe shall have a minimum softening point of 75°C when tested by the vicat method as described in BS 2782.

The pipe and gutter shall be colour Grey, to BS 5252, 10.A. 07, black white or rustic

3.14 uP.V.C. Rainwater Fittings

All fittings shall be injection mounted and shall be compatible with pipe and gutters and shall conform to BS 456 or the appropriate Kenya Standard.

All gutters pipe and fittings shall be Colour Grey to British Standard 5252, 12.A. 07 Or black, white or rustic.

Gutter connecting fittings shall have integrally moulded seal retaining cavities housing a rubber seal of hollow section. The fitting shall incorporate a gutter-retaining clip.

Gutter shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of gutter shall be 2.20mm

Rain water pipes shall be circular in section, 65mm nominal diameter complying in all respects to British Standard 4576 or the relevant Kenya Standard.

Rainwater pipes shall be supplied in plain-ended lengths. The minimum acceptable wall thickness of rainwater pipes shall be 1.80mm

Pipe support brackets must be adequate to screen expansion gaps.

The grade of UPVC used for gutter and pipe shall have a minimum softening point of 75⁰ C when tested by the Vicat method as described in BS 2782.

The pipe and gutter shall be Colour Grey, to BS 5252, 10.A.07. black, white or rustic.

3.15 UPVC Underground Drainage System

(a) Pipes and fitting

The pipes and fittings shall comply in all respects to British Standard 46600 & 581 or the relevant Kenya Standards.

Pipes shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of pipe and fittings will be as follows:

110mm pipe	3.0mm	
160mm pipe	3.9mm	
110mm junction only	3.50mm socket	3.80mm body
All other fittings	3.20mm socket	3.40mm body
160mm all fittings	4.30mm socket	4.70mm body

The method of jointing to be employed shall be by lip seal socketted fittings. Jointing to other materials shall be made in the manner specified by the manufacturer.

The grade of UPVC used for the pipes shall have a minimum softening point of 82⁰ C when tested by the 'Vicat' method 102D as described in British Standard 2494: 1976.

Holderbats shall be made of Mild Steel protected from corrosion by galvanizing or such coating for optimum fit. To fit pipe supports a special purpose made PVC packing piece may be used.

The base of soil and vent stack connection to the below ground drain shall be made with a bend of minimum centre lines radius of 250mm.

Minor changes of direction where permitted shall be made with a variable bend that has a constant effective length.

(b) Excavation of Trenches

The installation, method of joining shall confirm in all respects to the manufacturer's site work instruction.

Trenches shall be excavated to a sufficient depth to allow a 50mm minimum bed below the underside of the pipe. Trenches width shall be not less than the outlet diameter of the plus 300mm and not wider than necessary.

(c) Trench Invert

The base of the trench shall be such that even support is given to the pipe for its full length. Soft spots shall be removed and replaced with compacted granular material as described below. High spots and rock shall be removed to allow full 50mm-bed depth.

(d) Pipe bed

The bed shall be composed of granular material to the specification called for below and shall cover the full trench width and length and boned to gradient.

(e) Laying and jointing

Pipes and fitting shall be laid true to gradient in straight lines and joined in accordance with manufacturer's instructions. All pegs used for alignment and other purposes must be removed after

use and before side filling. All joints shall be watertight complying with CP 301, Clauses 5:3

Pipe barrels shall be in continuous contact with the trench bed when laid.

(f) Side Filling

The side filling of pipes shall be composed of hard granular material, which shall be to the requirements below.

Side fillings must be placed equally on both sides of the pipe and compacted, so as to buttress the pipes against the trench walls. Side filling shall continue up to pipe crown level as a minimum and above this level if required by the Engineer.

(g) Back Filling

The first 300mm of backfill above crown level shall be taken from selected trench spoil all passing 25mm sieve. It shall be placed in two 150mm layers each firmly tramped. Above the 300mm level mechanical fillings and compaction may be used.

Where cover is less than 450mm the pipe shall be covered with 75mm of selected material laid to support a concrete tile or slab indicating the presence of a service.

(h) Granular Material for Bed and Side Fill

The material may be composed of crushed stone, clinker, quarry scalping, ballast, gravel, shingle or all-in aggregate to British Standard 882.

All material for bed and site fill shall be hard and granular passing 20mm sieve and shall contain not more than 5 per cent fines passing 3mm sieve.

The material shall have a compaction factor of 0.3 or less.

4 Valves

a) Draw-off Taps and Stop Valves (Up to 50mm Nominal Bore)

Draw-off taps and valves up to 50mm nominal bore, unless otherwise stated or specified for attachment or connection to sanitary fitment shall be manufactured in accordance with the requirements of BS 1010.

b) Gate Valves

All gate valves 80mm nominal bore and above, other than those required for fitting to buried water mains shall be of Cast Iron construction, in accordance with the requirements of BS 3464. All gate valves required for fitting to buried water mains shall be of Cast Iron construction in accordance with the requirements of BS 1218.

All gate valves up to and including 65mm nominal bore shall be of Bronze construction in accordance with the requirements of BS 1952.

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

c) Globe Valves

All globe valves up to and including 65mm nominal bore shall be of Bronze construction in accordance with the requirements of BS 3061.

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

d) Check or Non-Return Valves

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 requirement of B.S.4090.

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

e) 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 Bronze or other corrosion resistant materials. These valves fall into three pressure classifications as follows: -

- | | | | |
|-------|-----------------|---|-----------------|
| (i) | Low pressure | - | 3.58 b maximum |
| (ii) | Medium pressure | - | 7.72 b maximum |
| (iii) | High pressure | - | 12.62 b maximum |

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

(f) Manually Operated Mixing Valves

Mixing valves for shower fittings and other appliances being provided under the sub-contractor Works shall be manufactured in accordance with the requirements of BS 1415 from Bronze or other corrosion resistant materials.

5 Waste Fitment Traps

a) 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 BS 1184.

In certain circumstances, Cast Iron traps may be required for cast iron baths and in these instances bath traps shall be provided which are manufactured in accordance with the full requirements of BS 1291.

b) Anti-Syphon Traps

Where anti-syphon traps are specified, these shall be similar or equal to the range of traps manufactured by Greenwood and Hughes Limited, Deacon Works Littlehampton, Sussex, England.

The trade name for traps manufactured by this company is 'Grevak'.

6 Pipe Supports

a) General

This sub-clause deals with pipe supports securing pipes to the structure of buildings for above ground application.

The variety and type of support shall be kept to a minimum and their design shall be such as to facilitate quick and secure fixings to metal, concrete, masonry or wood.

Consideration shall be given, when designing supports, to the maintenance of desired pipe falls and the restraining of pipe movements to a longitudinal axial direction only.

The Sub-contractor shall supply and install all steelwork forming part of the pipe support assemblies and shall be responsible for making good damage to builders work associated with the pipe support installation.

The Sub-contractor shall submit all his proposals for pipe supports to the Engineer for approval before any erection works commence.

b) Steel and Copper Pipes and Tubes

Pipe runs shall be secured by clips connected to pipe hangers, wall brackets, or trapeze type supports. 'U' bolts shall not be used as a substitute for pipe clips without the prior approval of the Engineer.

An approximate guide to the maximum permissible supports spacing in metres for Steel and Copper pipe and tube is given in the following table for horizontal runs.

Size Nominal s Bore	Copper Tube To BS 659	Steel Tube To BS 1387
15mm	1.25m	2.0m
20mm	2.0m	2.5m
25mm	2.0m	2.5m
32mm	2.5m	3.0m
40mm	2.5m	3.0m
50mm	2.5m	3.0m
65mm	3.0m	3.5m
80mm	3.0m	3.5m
100mm	3.0m	4.0m
125mm	3.0m	4.5m
150mm	3.5m	4.5m

The support spacing for vertical runs shall not exceed one and a half times the distances given for horizontal runs.

c) Cast Iron and Asbestos Cement Spigot and Socket Jointed Pipes

Cast Iron and asbestos cement socketed pipes shall generally be supported at every socket joint by means of either Holderbats secured rigidly to the structure, or purpose made scrapes for attachments to rigid steel support brackets.

When Holderbats are used, they shall conform to the requirements of BS 416. Suitable anchors shall be provided at all changes of pipe directions, junctions and tees to counteract the effect of end thrust loads.

(d) Asbestos Cement Pressure Pipe

Asbestos Cements pressure pipe with either cast iron detached joints or asbestos cement screw joints shall be supported and anchored on either side of the joints. The joints shall remain free.

Pipe hangers and trapeze type supports shall not be suitable for the suspension of asbestos pressure pipes unless they are designated with suitable restrictions to prevent swinging at the same time providing the necessary support requirements.

Within building, asbestos pressure pipes shall be carried either on concrete support on rigidly fixed steel wall brackets.

Suitable anchors shall be provided at all changes of pipe directions junctions and tees to counteract the effect of end thrust loads.

(e) Concrete and Pitch Pipes

These pipes shall not be used for above ground application.

f) Expansion Joints and Anchors

Where practicable, cold pipework systems shall be arranged with sufficient bends and changes of direction to absorb pipe expansion providing that the pipe stresses are contained within the working limits prescribed in the relevant BS specification.

Where piping anchors are supplied, they shall be fixed to the main structure only. Details of all anchor design proposals shall be submitted to the Engineer for

approval before erection commences.

The Sub-contractor when arranging his piping shall ensure that no expansion movements are transmitted directly to connections and flanges on pumps or other items of plant.

The Sub-contractor shall supply flexible joints to prevent vibrations and other movements being transmitted from pumps to piping systems or vice versa.

7 Sanitary Appliances

All sanitary appliances supplied and installed as part of the Sub-contract works shall comply with the general requirements of BS Code of Practice 305 and the particular requirements of the latest BS Specifications.

8 Pipe Sleeves

Main runs of pipework are to be fitted with sleeves where they pass through walls and floors. Generally the sleeves shall be of PVC except where they pass through the structure, where they shall be of mild steel. The sleeves shall have 6mm – 12mm clearances all around the pipe or for insulated pipework all around the installation. The sleeve will then be packed with slag wool or similar material.

9 Installation

9.1 General

Installation of all pipework, valves, fittings and equipment shall be carried out under adequate supervision from skilled staff to the relevant codes and standards as specified herein. The Sub-contractor shall be responsible to the Main Contractor for ensuring that all builders' work associated with his piping installation is carried out in a satisfactory manner to the approval of the Engineer.

9.2 Above Ground Installation

a) Water Services

Before any joint is made, the pipes shall be hung in their supports and adjusted to ensure that the joining faces are parallel and any falls which shall be required are achieved without springing the pipe.

Where falls are not shown on the Contract Drawings or stated elsewhere in the Specification, pipework shall be installed parallel to the lines of the buildings and as close to the walls, ceilings, columns, etc., as is practicable.

All water systems shall be provided with sufficient drain points and automatic air vents to enable them to function correctly. Valves and other user equipment shall be installed with adequate access for operation and maintenance. Where valves and other operational equipment are unavoidably installed beyond normal reach or in such position as to be difficult to reach from a small stepladder, extension spindles with floor or wall pedestals shall be provided.

Screwed piping shall be installed with sufficient number of unions to facilitate easy removal of valves and fittings, and to enable alterations of pipework to be carried out without the need to cut the pipe.

Full allowances shall be made for the expansion and contraction of pipework, precautions being taken to ensure that any force produced by the pipe movements are not transmitted to valves, equipment or plant.

All screwed joints to piping and fittings shall be made with P.T.F.E. tape.

The test pressure shall be maintained by the pump for about one hour and if there is any leakage, it shall be measured by the quantity of water pumped into the main in that time. A general leakage of 4.5 litres per 25mm of diameter, per 1.6 kilometre per 24 hours per 30 metres head, may be considered reasonable but any visible individual leak shall be repaired.

b) Sanitary Services

Soil, waste and vent pipe system shall be installed in accordance with the best standard of modern practice as described in BS 5572 to the approval of the Engineer.

The Sub-contractor shall be responsible for ensuring that all ground waste fittings are discharged to a gully trap before passing to the sewer via a manhole.

The Sub-contractor shall provide all necessary rodding and inspection facilities within the draining system in positions where easy accessibility is available.

Where a branch requires rodding facilities in a position to which normal access is unobtainable, then that branch shall be extended so as to provide a suitable purpose made rodding eye in the nearest adjacent wall or floor to which easy access is available.

The vent stacks shall terminate above roof level and where stack passes through roof, a weather skirt shall be provided. The Sub-contractor shall be responsible for sealing the roof after installation of the stacks.

The open end of each stack shall be fitted with a plastic coated or galvanized steel wire guard. Access for rodding and testing shall be provided at the foot of each stack.

c) Sanitary Appliances

All sanitary appliances associated with the Sub-contract works shall be installed in accordance with the best standard of modern practice as described in C.P. 305 to the approval of the Engineer.

9.3 Underground Installation

a) General

All underground water and drainage service installations shall be carried out in accordance with the best standard of modern practice as described in C.P. 301 and C.P. 310 respectively and the following clause.

b) Sequence of Operation for Underground Service Installation

(i) Setting Out

As described in BS code of practice 301 Clause 502

(ii) Breaking Up Surface (If in Roads)

As described in BS code of practice 301 Clause 503

(iii) Excavation and Timbering

As described in BS code of practice 301 and 503 and the following:-

Excavation shall be made to such depths and dimensions as may be required by the Engineer to obtain prior falls and firm foundations. No permanent constructions shall be commenced on any bottom until the excavation has been examined and approved by the Engineer.

Should the Sub-Contractor in error or without the instructions of the Engineer make any excavation below the required level of the pipe or bed, as the case may be, then he shall be required to refill such excavation to the correct levels with concrete 1: 4 : 8 to 38mm maximum aggregate size.

The Sub-Contractor's prices shall have included for excavating in all materials met with, for trimming bottoms to the necessary falls and for any extra excavation required for planking, strutting and working space.

The Sub-Contractor shall keep the whole of the trenches or other excavations free from water and shall execute such works and install such pumps as may be necessary to keep the excavation dry at all times.

No sub-soil water shall discharge into the sewage system without written permission of the Engineer.

(iv) Laying of Concrete Beds or other Supports for Pipes

As described in BS code of practise 301 Clause 504 and the following:-

All drains below buildings and roads shall be encased in concrete 150mm thick.

Concrete beds and supports shall be concrete 1:3:6 to 25mm maximum aggregate size.

(v) Pipe Laying and Jointing

Drain pipes shall be laid and jointed as described under BS code of practice 301 clause 505.

Water pipes shall be laid and jointed as described under BS code of practice 310, Clause 401, 402, 403 and 404

(vi) Manholes

(a) General

All manholes provided under the Sub-Contract works shall be constructed of approved materials and in an approved manner, by the Main Contractor.

All manholes shall be watertight and if constructed of brickwork, solid block work or stone work, they shall be rendered internally with a cement mortar of at least 12mm thickness and finished with a smooth surface.

The sides of all channels in every manhole shall be ought up vertically to a height of not less than the diameter of the drain and shall be benched in good concrete from the top of the channels at an surface with a coat of 1:1 cement mortar.

In all other respects, manhole shall be constructed in accordance with BS code of practice 301

(b) Rectangular and Square Manholes

Rectangular and square straight through manholes shall be constructed from brickwork, solid blockwork, stone and concrete to comply with the following minimum internal dimensions (millimetres)

Depth below internal Ground of Access Outgoing shaft Invert Dimension SLXW	Size of Main Shaft Diameter	Internal Chamber Dimension SLXW	Height of Chamber above Benching	wall Thickness
Up to 740	100 to 150	610x460		150
Up to 740	230 to 460	760x760		150
Up to 1200	100 to 150	760x760		150
160 to 1200	230 to 460	910x910		150
1220 to 1800	100 to 150	910x910		150
1220 to 1800	230 to 460	1070x910		150
1830 to 4550 760x760	100 to 150	1370x910	1370	230
1830 to 4550 760x760	230 to 460	1370x1070	1370	230
4570 & Over 760x760	100 to 150	1370x1140	1680	230
4570 &Over 760x760	230 to 460	1370x1140	1680	230

When branches are connected into the manhole, the length and width dimension of the chamber shall be increased as follows:-

c) Length

Branch Diameter

100mm 300mm/branch on the side with most branches

150mm 380mm/branch on the side with most branches

230and 300mm 460mm/branch on the side with most

branches 460mm 610mm/branch on the side with most

branches

Width

Branch Diameter

100mm to 300mm for each side with branches plug

160mm 460mm or the diameter of the main drain which ever is the greater

(a) Precast Concrete Circular Manholes

Where specified straight through precast concrete manholes shall be manufactured and constructed to comply with BS 556 and the following dimensional requirements, (Dimension: Millimetres)

Depth Ground of Outgoing Invert	Internal Access Shaft Diameter	Size Main Channel Diameter	Chamber Diameter	Height Chamber Above Benching
Up to 740	-	100 to 460	910	-
760 to 2410	-	100 to 460	1070	-
2440 to 4550	-	100 to 460	1220	1370
4570 & over	760	100 to 460	1370	2680

When branches are connected into manhole the internal diameter of the chamber shall be increased as necessary up to maximum chamber diameter 1830.

(b) Steps Iron and Covers

Access shaft to manhole of depth greater than 760mm shall be provided with approved steps iron at suitable intervals. Every manhole or manhole access shaft shall be fitted with a removable airtight cast iron cover to adequate size and strength, fixed in a manner that prevents surface water gaining into the system.

Cast manhole covers and frames shall be manufactured in accordance with the requirements of BS 497 and shall generally be classified into the following categories:

Heavy Duty : For

Carriageway Medium Duty :

For Footpaths

Light Duty : For domestic premises or other places where they do not have to carry wheeled Traffic.

(c) Back Drop Connections

Where the level of the branch drain entering the manhole is higher than can be suitably accommodated by the normal type benching, then the branch drain shall be connected to the manhole by means of a back drop Connection.

(d) Channels

Where the branch channel connects to the main channel in the manhole, the invert of the branch channel shall be a minimum of 38mm higher than the main channel.

(e) Testing of Pipelines

After pipelines are connected up and joints have been sealed, the pipeline shall be tested before pipes are, if required haunched or surrounded in concrete

Methods of testing and inspection shall be in accordance with Clause 4 of the Specification.

(f) Concrete Bedding Hunching and Surround

Concrete 3 bedding, hunching and surrounding shall be provided as necessary o where called for by the Engineer in accordance with the requirements laid down in BS code of practice 301, Clause 310

(i) Backfilling

Backfilling of trenches, headings and around manholes shall be carried out in accordance with the methods described in BS code of practice 301, clause 508.

(j) Reinstatement of Surface

Following the final Backfilling of all trenches, headings and manhole surrounds, the surface of the excavated areas shall be fully reinstated to the approval of the Engineer.

Where excavation have been carried out in public highways or other areas are not forming part of the site, the sub-contractor shall be deemed to have allowed in his price for all charges associated with the temporary and final reinstatement requirements of the local of highway Authority concerned.

No Claims for extra in this respect will be accepted.

(k) Sewer Connection

Sewer Sub-contractor shall pay all charges associated with the connection by the local Authority of the drainage to the main sewer, including necessary reinstatements

10 Testing and Inspection

10.1 Site Tests – Pipework Systems

a) Above Ground Internal Water Services Installation

All water service pipe system installed above ground shall be tested hydraulically for a period of one hour to not less than one and half times to design working pressure.

If preferred, the Sub-contractor may test the pipelines in sections. Any such section found to be satisfactory need not be the subject of a further test when system has been completed, unless specifically requested by the Engineer.

During the test, each branch and joint shall be examined carefully for leaks and any defects revealed shall be made good by the Sub-contractor and the section re-tested.

The Sub-contractor shall take all necessary precautions to prevent damage occurring to special valves and fittings during the tests. Any item damaged shall be repaired or replaced at the Sub-contractor's expenses.

b) Underground Water Mains

After laying, jointing and anchoring, the main shall be slowly and carefully charged with water, so that all air is expelled and allowed to stand full for three days before testing under pressure.

A long main shall be tested in sections as the work of laying proceeds and all joints shall be exposed for inspection during the testing.

The open end of the main may be temporarily used for testing under moderate pressure by fitting

a water pipe expanding plug, of which several types are available. The end of the main and the plug should be secured by struts or otherwise, to resist the end thrust of the water pressure in the main.

If the section of main terminates with a sluice valve, the wedge of the valve shall not be used to retain the water, instead the valve shall be fitted temporarily with a blank flange, or if a socket valve with a plug and the wedge shall be placed in the open position while testing. The Sub-Contractor shall provide suitable end supports to withstand the end thrust of the water pressure in the main.

c) Above Ground Soil Waste and Ventilation System

All soil, waste and ventilating pipe system forming part of the above ground installation, shall be given appropriate test procedures as described in BS 5572, 1972.

Smoke tests on above ground soil, waste and ventilating pipe system shall not be permitted. Pressure tests shall be carried out before any work which is to be concealed is finally enclosed. In all respects, tests shall comply with the requirements of BS 5572.

d) Underground Drainage System

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

Short branch drains connected to a main drain between manholes shall be tested as one system with the main drain. In long branches a testing junction shall be inserted next to the junction with the main drain and the branch tested separately. After the test has been passed, the testing junction shall be effectively sealed.

Water tests shall be carried out in accordance with the methods described under BS 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 more than 10,360 head at any point in the section.

The test pressure shall be maintained for a period of one hour during which time the pipe and joints shall be inspected for sweating and leakage. Any leak discovered during the tests shall be made good by the Sub-Contractor and the section re-tested.

In addition to pressure tests, drain pipe runs shall also be tested for straightness where applicable. This test shall be carried out in accordance with one of the two methods described in BS code of practice 301, clause 601 (e).

Testing of manholes shall be carried out in accordance with the methods described under BS code of Practice 301, clause 602 (f)

(e) Above Ground Soil Waste and Ventilation System

All soil waste and ventilating pipe system forming part of the above ground installation, shall be given appropriate test procedures as described in BS 5572 1972

Smoke tests on above ground soil, waste and ventilation pipe system shall not be permitted.

Pressure tests shall be carried out before any work, which is to be concealed, is finally enclosed. In all other respects, testes shall comply with the requirements of BS 5572.

10.2 Site Test – Performance

Following satisfactory pressure test on the pipework system, operational tests shall be carried out in accordance with the relevant BS Code of practice on the systems as a whole to establish that special valves, gauges, control, fittings, equipment and plant are functioning correctly to the

satisfaction of the Engineer.

All hot water pipework shall be installed with pre-formed fibre glass lagging to a thickness of 25mm where the pipe runs above a false ceiling or in areas where the ambient temperature is higher than normal with the result that pipe “sweating”, due to condensation will cause nuisance.

All lagged pipes which run in a visible position after erection shall be given a canvas cover and prepared for painting as follows:

- i) Apply a coating of suitable filler until the canvas weave disappears and allow to dry.
- ii) Apply two coats of an approved paint and finish in suitable gloss enamel to colours approved by the Engineer.

All lagging for cold and hot water pipes erected in crawl ways, ducts and above false ceiling which, after erection are not visible from the corridors of rooms, shall be covered with a reinforced aluminium foil finish banded in colours to be approved by the Engineer.

In all respects, unless otherwise stated, the hot and cold water installation shall be carried out in accordance with the best standard of modern practice as described in C.P.342 and C.P.310 respectively to the approval of the Engineer.

The test pressure shall be applied by means of a manually operated test pump or, in the case of long main or mains of large diameter, by a power driven test pump which shall not be left unattended. In either case precautions shall be taken to ensure that the required pressure is not exceeded.

Pressure gauges should be recalibrated before the tests.

The Sub-contractor shall be deemed to have included in his price for all test pumps, and other equipment required under this specification.

The test pressure shall be one and a half times the maximum working pressure except where a pipe is manufactured from a material for which the relevant BS specification designates a maximum test pressure.

11 Sterilization of Hot and Cold Water Systems

All underground and above ground water distribution systems cisterns, tanks, pumps etc shall be thoroughly sterilized and flushed out after the completion of all tests and before being fully commissioned for handover.

The sterilization procedures shall be carried out by the Sub-contractor in accordance with the requirements of BS Code of Practice 301, Clause 409 and to the approval of the Engineer.

12 Water Mains

12.1 Piping

All piping shall be plain ended and suitable for use with flexible mechanical couplings (e.g. Viking Johnson, Dresser or Gibault). Steel pipes shall comply with BS 534-Galvanised steel pipes for distribution system shall comply with BS Galvanized steel pipes for distribution system shall comply with BS 1387-1967 medium tubes and be supplied with flanges on pipes 75mm diameter and over. All pipes less than 75mm diameter shall be screwed and socketed, unless otherwise stated.

12.2 U.P.V.C Pipes

UPVC piping shall be in accordance with BS 3505: 1968.

The maximum sustained working pressure to which the pipes and fittings will be subjected is based on water at a temperature of 20° c.

The Contractor shall submit full details of the colour of the pipe he intends to supply. The Colour of the pipe shall be such as to meet the requirements of Clause 2 ‘material’ and Clause 8.5 ‘opacity’ of BS 3505.

The pipes up to and including 50mm diameter shall be of solvent weld type. The pipe shall be supplied with interchangeable sockets pre-formed at the factory and of such internal diameter that it takes the plain end of the pipe with same nominal diameter.

The joints shall sustain the end thrust to which the pipe shall be submitted. The contractor shall supply sufficient quality of the cleaner and adhesive which shall be required to make the joints with the pipes.

The pipes of 75mm diameter and over shall consist of a grooved socket at one end of the pipe. The socket shall be designed to give a clearance fit on the outside diameter of the parent pipe. The sealing medium that shall seat in the groove shall be a rubber ring.

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

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

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

The joint shall take 10% deformation of the spigot at the point where the stress points where it enters the socket without leakage from the pipe when subjected to the test pressure specified for the pipe. Thermal expansion of the pipe shall be accommodated in the joint. The joint shall be capable of lined deflection up to 30°.

The sealing ring shall supply be of the first grade natural rubber and the physical properties of the mix shall meet the requirement of BS 2494.

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

The fittings shall have the same type of joint and or the pipes to be used. The contractor shall submit full lists of the materials, dimensions and test pressures of the fittings offered.

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

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

All jointing of pipes and fittings shall be carried strictly in accordance with the manufacturer's instructions.

12.3 Manufacturer's Instructions

The contractor shall be responsible for obtaining copies of any manufacturer's instructions for pipe joining and shall familiarize himself and his employees with these instructions.

All necessary tools and equipment required for laying, jointing and testing of pipes and joints shall be provided by the contractor at no extra cost.

12.4 Fittings and Specials for Galvanized Steel Pipes

All specials shall be of such dimensions as will meet with piping supplied. Screw down stop valves shall comply with BS 1010. Specials shall comply with BS 1740.

12.5 Flanged Adaptors and Flanges

Flanged adaptors shall be piece suitable for connecting a flanged sluice valve to the type of piping supplied. All flanged or special shall conform to BS 10 part 1 and shall be drilled to Table 'C' and machined across the faces. The flanged adaptors shall comply with BS 78 and BS 3961. All PVC flanged shall be supplied with metal backing rings jointing of flanges shall be carried out using the joint rings, bolts and washers as necessary.

12.6 Tees

The spigot ends of all tees shall be suitable for connection to the pipework supplied using the aforementioned flexible mechanical joints and branches shall be flanges drilled to BS 10 table 'C'.

12.7 Hydrants

Hydrants shall comprise a 75mm sluice valve and a 75mm Duckfoot bend with gunmetal screw connection to detailed drawings. These specials shall comply with the requirements of BS 750: 1964.

12.8 Gate Valves

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

All gate valves required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of BS1218.

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

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

12.9 Air Valves

Air valves shall be of cast iron conforming to BS 14 52 Grade 14. They shall not be suitable for working pressure nor less than that specified for the class of pipe to which they are connected.

12.10 Ball Float Valves

Ball float valves shall be to BS 1212 parts 1 and 2 shall be suitable for working pressure not less than the working pressure for the class of pipe specified for connection to the ball float valve.

12.11 Non-Return Valves

Non-return valves shall be of cast iron with flanges and shall conform to BS 4090: 1966.

12.12 Stop Cocks

Stopcock up to 50mm diameter shall be brass and shall conform to BS 1010 part 1: 1959 part 2;1973.

12.13 Rubber and Insertion Jointing

Rubber and insertion jointing for flange jointed shall comply with BS 2494 part 1 and no jointing rings shall be used in the contract, which have not been supplied by manufacturers approved by the Engineer.

12.14 Bituminous paints

All bituminous or tar paints for protection of buried steel bolts, pipes specials etc. shall be the best of their respective kinds manufactured by approved makers.

12.15 Steel Pipe and Fittings for Rising Main

All piping shall be plain ended and suitable for use with flexible mechanical couplings (e.g. Viking Johnson, dresser) The grade of steel used shall comply with the requirements of BS 3601: 1964. Pipes shall be welded

or seamless and shall conform to BS 534: 1966 or an equivalent acceptable standard.

All pipes shall be externally and internally protected with bitumen in accordance with clauses 5.4 and 5.5 of BS 534: 1966.

The external protection shall be reinforced with oven glass, cloth glass , tissue wrapping or by other approved material.

The ends of all bitumen lined pipes, fittings and specials shall be closed by means of discs or other suitable covers firmly held in place.

12.16 Drain-Off Taps, Stops Valves for Water Services

Fittings for mains of size 50mm or under shall comply with BS 1010. Samples must be submitted to the Engineer for approval prior to installation of fittings.

12.17 Storage of Plants and Material

The contractor shall, at his own expenses, make arrangements for dumps along the route of the pipe line for a storage of pipes, his plant and materials to suit his own convenience, but such arrangements shall be subjected to the Engineer's approval.

12.18 Loading, Handling and Conveying of Pipes

The contractor shall before commencing to lay the pipes, valves or other materials examine them and ascertain that they are in perfectly sound condition and he shall be responsible for any laying. The stocking of pipes and specials on site, loading and unloading etc. shall be carried out to the satisfaction of the Engineer.

12.19 Interferences with Fences, Drains, Pipes, Property etc.

The contractor shall ensure the proper reinstatement of fences, drains, telephone lines, KP&LC. Cables etc where affected by his work. All service shall be adequately protected and propped to the satisfaction of the Engineer. The contractor shall be liable for any damage caused to the service due to his failure to provide adequate protection.

12.20 Method of Excavation

- a) The Contractor shall excavate the pipe trenches in the line and to the depths indicated by the Engineer. Except where otherwise indicated on the Drawings or indicated by the Engineer, it is intended that the trench shall be excavated to such a depth as will allow of a minimum cover of 5000mm over top of the barrel of the pipe when laid plus or minus a tolerance of 75mm either way. All trenches shall be excavated in open cuttings.
- b) Where the trenches passes through grassland, arable land or garden, whether enclosed or otherwise, the turf, if any shall be pared off and stalked, and the productive soil shall be carefully removed for a width of 600mm greater than the nominated trench width or equal to the overall width of track of the excavating machine, whichever is greater, and laid aside to be subsequently used in reinstating the surface of the ground after the trench has been refilled.
- c) The bottom of the trench shall be property trimmed off, and all low places or irregularities shall be where rock or large stones are encountered, they shall be cut down to a depth of at least 75mm
below the level at which the bottoms of the barrel of the pipes are to be laid, and covered to a like depth with materials, so as to form a fine and even bed for the pipe.
- d) Joints holes shall be excavated to suit minimum dimension as to allow the joints to be well and properly jointed.
- e) The pipe trench shall be kept clear of water at all times.
- f) The contractor shall whenever necessary by means of timbering, or otherwise support the sides of the trench so as to make them thoroughly secure, and afford adequate support to adjoining roads, lands, buildings and property during the whole time the trench remains open and shall remove such timbering or other work shall be deemed to be included in the rate for excavation. Incase the Contractor is instructed by the Engineer to leave any portion of such timber in position, he will be paid for it accordingly.
- g) The cleared width inside the timbering in the case of single pipes shall be at least 320mm in excess of the external diameter of the pipe be laid, in order to allow it to be freely lowered into position, in the trench without damage to the external protection.
- h) Where more than one pipe is to be laid parallel, then the clear width inside the timbering shall

be at least 520mm in excesses of the combined external diameters of the pipes.

- i) Should the excavations be taken out to a greater depth than is specified the bottom shall be made good to the correct level with mix 1:3:6 concrete or other materials approved by the Engineer. No payment shall be made for any other excavation carried out by the contractor and the cost of filling up to required levels.
- j) If a mechanical excavator is used by the contractor, he shall indemnify the employer against all claims for damages that in the opinion of the Engineer, may be caused by the use of this plant. When a mechanical excavator is used the bottom 230mm of excavation shall be got out by hand to ensure an even bed for the pipes.

12.21 Main Laying

Mains shall be laid in straight lines and/or smooth curves as indicated on the drawings. The vertical profile of the pipes shall be to even gradients. Any pipes not so laid shall be removed if so directed by the Engineer, and re-laid in proper manner at the contractor's expense.

In laying the pipes and specials, care shall be taken not to damage the protective linings and the pipes shall be handled with tackle as directed by the Engineer.

The pipes and specials shall be slug and sounded with hammer for flaws before they are lowered into trench. After the pipes or specials have been checked they shall be cleaned internally and carefully lowered into trench and set to proper gradient and line so that is a continuous rise from each washout to air valve.

12.22 Temporary Bench Marks and Sight Rails.

The contractor shall fix rails for use with boning rods at intervals of not more than 65 meters and temporary Bench mark related to the survey of Kenya Datum shall be provided at intervals as directed by the Engineer.

12.23 Curves and Bends

Large diameter curves of main shall wherever possible be formed by giving a set not exceeding 30 to each joint, bends being used only where large diameter curves are not possible.

12.24 Cutting of Pipes

The contractor shall, subject to approval of the Engineer, cut pipes to such lengths as directed. Pipes should be cut off clean and square while the axis cuts should be made with an approved cutter from rotary cutting machine, engineer may approve cutting by oxyacetylene cutters.

12.25 Flanged Joints

In laying pipes and specials with flanged joints, flanges shall be brought together and bolted with the faces absolutely parallel. A rubber jointing ring 3mm thick shall be used in each flange joint and one washer with each bolt. The ring shall be a strip ring lying within the bolt circle and full flange width ring. The bolts shall be tightened up gradually and equally in customary manner in order to distribute the stress evenly over the flange.

12.26 Surface Boxes

Sluice valves, air valves and fire hydrants shall be covered with surface boxes in accordance with details as shown on the Drawings. In roads and footpaths the boxes shall be laid flush with the surface.

12.27 Fixing of Valves, Air Valves and Washouts Pipes

The contractor shall fix the sluice valves, air valves, washout pipes complete with iron casing for spindles and surface boxes in accordance with and in position shown on the drawings. As far as possible the cutting of pipes for this should be avoided.

12.28 Support and Anchor Blocks

Concrete mix 1:3:6 shall be placed around and against bends and other specials in trenches.

12.29 Colour Coding

All underground pipes are to be wrapped with adhesive plastic tape at each meter in colours blue for drinking water and green for untreated water. All pipework above ground and valves in valve chambers and pits are to be painted in similar colours.

12.30 Lettering

The lettering for sluice valves, fire hydrants, air valve and washout abbreviated SV FH and WO respectively shall be in accordance with the detail shown on the Drawings colour as detailed hereafter: -

Untreated water:	White lettering on green background
Drinking water:	White on blue background
Fire Hydrant:	White lettering on yellow background

12.31 Testing

- a) The test pressure shall be one and a half the maximum working pressure except where a pipe is manufactured from a material for which the relevant BS specification designates a maximum test pressure should not exceed 120,180 and 240 meters/head for clause B, C, or D pipes, respectively. The pump shall maintain the test pressure for about one hour and if there is any leakage it shall be measured by the quantity of water pumped into the main that time.

b) When a section of the mains has been jointed, the ends shall be closed with caps, plugs or flanges, which must be strongly strutted against a solid backfilled rammed as hereinafter and as shown on the Drawing, for it's whole length so as to cover the mains to a depth of not less than 500mm, except at the joint holes which shall be kept clear of all backfiring, if necessary by the use of timbering, so that each joint is left fully exposed for inspection. No backfilling will be permitted before testing of each section.

As long a section of main as possible shall be tested at one time subject to the maximum length of open trench approved by Engineer or permitted by the Highway Authority, and the test shall be carried out within 12 working days of the completion of such sections of mains.

Where a main is laid across a road or in such a position as to interfere seriously with the normal use of the road, the contractor may, with the consent of the Engineer and at his own risk, fill in such joint holes as may be necessary.

He shall at his own expense, re-excavate any or all joint holes necessary to locate a leak and carry out repair work should the results of his hydraulic test prove unsatisfactory.

The section shall then be filled with mains water, great care being taken to drive out all air through air valves, ferrules or otherwise to the approval of the Engineer.

- c) After the section to be tested has been charged and all air liberated it shall standing underrate moderate pressure for several days' final airing. The leakage from the mains and connections from each section tested shall not exceed 4 litres per 25mm diameter of main, per 2Km. Length each 24 hours, every 30 meters head of pressure, and any visible individual shall be repaired.

To determine the rate of leakage, the contractor shall furnish a suitable hydraulic test pump, pressure gauge, connection and water meter or other appliance, for measuring the amount of water pumped. If the leakage were at a greater rate than that specified, the contractor should re-excavate the trench where necessary and shall remake the joints and replace defective work until the leakage shall be reduced to the allowable amount.

- d) The employer shall charge the contractor the cost of any coupling required to join up tested lengths of main if, in the Engineer's opinion, greater lengths could reasonably have been tested or if failure under test requires the pipe to be cut, or other methods of laying should have been adopted.

The contractor shall supply water used by the contractor in testing the main.

The contractor shall carry out all work, which may be necessary for making temporary connections to the existing mains to obtain water for testing at his own expense.

e) In carrying out the test for water tightness only the Engineer shall authorize the operation of all valves, but the contractor shall provide all the necessary labour to assist in the opening and closing of the valves to the Engineer's instructions and he shall allow in his price for all his expenses in connection with testing on completion.

The Engineer shall be the sole judge of water tightness.

12.32 Cleansing and Sterilizing the Main

When a pipeline is complete and where applicable, has successfully passed the test it shall be thoroughly washed out using, if possible, an open end. Thereafter it shall be sterilized by being filled with a suitable solution containing not less than 20p.p.m. of free available chlorine or such other Sterilizing agent as the Engineer shall approve. After standing for 24 hours the main shall again be washed out and refilled with

mains water prior to the taking of Bacteriological samples.

The contractor shall provide all necessary stop-ends fittings and chemicals for this work.

Emptying and washing out of the pipes shall be done in such a manner as not to damage the trench or cause due flooding of vicinity, and the contractor shall supply and use such piping, specials and/or hose as may be necessary to facilitate the flow of water to the nearest drain or watercourse. Water used for washing out and sterilizing will be supplied by the employer.

Before any section of the mains is put into use, bacteriological samples will be taken by the Engineer's representatives and only on the receipt of a satisfactory certificate from the medical Research Laboratory of the Employer will the main or section of main be permitted to be put into supply and be considered as having been substantially completed.

Any expenditure involved in Providing facilities or materials for taking of samples shall be included in the contractor's tendered rates and Engineer will specify and shall be sole judge as to the number of sample required and points at which they are to be taken.

The cost of the Bacteriological Examination will be borne by the employer but if the sample and samples are not satisfactory the cost of any subsequent analyses will be borne by the contractor.

12.33 Clearance of Site

The contractor shall remove all surplus pipes, special and other fittings from the site as directed by the Engineer. The site of works shall be leveled and all surplus excavation, debris, cut trees or bushes shall be carted to the approved tip sites.

12.34 Existing Installations

a) Cold Water

Where pipes for cold water are to be connected up to existing installations, the condition of the existing installation is to be reported to the Engineer in order to establish if part of the existing installation is to be replaced.

b) Sanitary Fittings

Where existing sanitary fittings are to be removed or replaced, the fittings are to be removed with utmost care and fittings and taps to be handed over to the client.

c) Sealing Off Existing Drains and Manholes

Existing foul, surface water and subsoil drains exposed during progress of work are to be recorded and reported for investigation by the Engineers. Where not required to be removed, seal off with concrete or grout solid as directed. Seal off connection to manholes, demolish wall to 50mm below surrounding ground level and fill remainder of manhole with consolidated approved rubber and cover to level of surrounding ground as directed.

13 Cold Water Storage Tanks

Cold-water storage tanks shall include the ball valves and connectors for inlet, supply, washout, and overflow and may also include in his pricing the price of the overflow and amount pipes to a place to be indicated by the Engineer. He shall also include the washout valve.

Where paint is required the sub-contractor shall use the paints, which will not be toxic. The tanks shall be manufactured to the following British Standards: -

- (a) Galvanized Mild Steel tanks to BS 417
- (b) Sectional Steel tanks to BS 1564

Where non-standard sizes shall be used, they shall be manufactured to the relevant standard but with the approval of the Engineer.

14 Water Heaters

Electricity Heated

Non-pressure and low-pressure types domestic electric water heaters shall comply with BS 843:1964. High- pressure types shall be of a standard not less than the appropriate BS

Domestic heaters shall, if nothing else is specified with 25mm thick fibreglass lagging and enclosed in the corrosion-proofed steel, finished in white stove enamel and be similar to manufactured 'HEATRAE'

Electric thermostatically controlled immersion heaters shall comply with BS 3456 section A8:1963 and C.P. 324. 202:1948.

Purpose made storage water heaters of the specified size shall comply with BS 853 and shall be to the specified working and test pressure. The heaters shall be provided with all necessary bosses, coils etc, and shall be hot dip galvanized after manufacture. Installation shall, if nothing else is specified, be fibreglass to the specified thickness with finish suitable for painting.

Domestic heaters for floors mounting shall, if not provided with legs, be mounted on a minimum 100mm high concrete plinth.

Floor mounted purpose made heaters shall be provided with minimum 225mm high legs of sufficient strength welded to the heaters and to suitable floor plates. Before galvanizing, wall mounted heaters shall be supplied with all necessary brackets.

15.0 Electrical Services

Suitably rated control panels shall be supplied and installed as part of this section of the Contract to meet the starting and operating characteristics of the fan, and motors.

The panels shall be either wall or floor mounted to suit the specific area and requirements. Power supplies to these panels shall be extended from adjacent isolating switches to be provided under the electrical services section of this Contract. Complete co-ordination shall be maintained with the electrical services to ensure supply and termination details are satisfactorily carried out to suit the plant and installation requirements.

15.1 Motor Control Panels

All starters, control equipment and the like shall be enclosed in purpose made sheet panels. The panels shall be installed within the plant rooms to suit the dimensions of the actual panels. All details of the panels and layouts within the plant shall be to the approval of the Engineer and shall include:

- Triple pole isolating switch removable neutral link and HRC fuses.
- Control circuit fuses of the HRC cartridge type
- Under voltage release, adjustable and complete tower to allow for voltage associated with the electrical supply and motor starting.
- Over voltage protection, details to be agreed.
- Ammeter of the moving iron mounted on panel with selector switch.

- Pilot lamp, green.
- Rotary switch for HAND/OFF/AUTO operation, where required. Removable neutral link of heavy section copper.
- Motor winding over-temperature release. The Contractor shall provide this feature in conjunction with the specified thermistor protection
- Duty selection switches.
- Manual stop-start button units to operate in conjunction with rotary switch.
- Hours run meter/counter.

The Contractor shall allow at present for the contractors to re-close automatically on the restoration of the mains voltage. This requirement shall be subject to further discussions with the Employer to suit the Diesel plant and the mode of operation of electrical supplies.

All starter panels shall include sufficient miniature circuit breakers, with neutral bar, to supply auxiliary or associated equipment. One 30TP and one spare 15TP MCBs shall be included as spares.

All starter panels, motor starters and controllers shall comply with BS 587. Enclosures shall be rigid, at least 1.6mm thick, with rolled corners stiffened as necessary, dust-proof, vermin-proof, damp and corrosion protected with a grey colour stone enamel or other approved finish, fully tropicalised, with washable air filters. Instruments, gauges, ammeters, indicator lamps, etc shall be flush mounted. Panel doors shall include isolating switches to prevent them being opened unless the switches are in the off position. Each door shall be provided with a lock, and three sets of keys for all panel door locks shall be handed over to the Engineer.

Terminals for all outgoing main and control cables shall be marked and positioned so that the cables may be carried to the outlet from the panel without crossing or being carried round the panel. Terminal numbers and markings shall correspond to those used on connected equipment and wiring diagrams. All internal interconnecting wiring between individual units and the terminal chamber shall be carried out by the panel manufacturer.

Each panel shall be provided with a main isolator so that the whole panel may be completely isolated.

The Contractor shall determine all motor starter requirements and associated auxiliaries and controls prior to manufacture and shall submit the design and circuit diagrams to the Engineer for approval.

Contractors shall determine all motor starter requirements and associated auxiliaries and controls prior to manufacture and shall submit the design and circuit diagrams to the Engineer for approval.

Contractors shall be of air-break type BS 5424 Part 1 and/or BS 587, and shall be provided as follows:

- Magnetic blow-outs and air chutes on each pole.
- Renewable hard drawn copper contacts.
- Auxiliary contacts for remote control.
- Continuously rated operating coils, (Max 240V)
- Thermal overload protection device incorporating single phasing

protection. Starters shall be rated as follows:

Ordinary duty - For motors which will run continuously for periods in excess of two hours.

Intermediate duty - For motors under automatic control other than time controls. When the intervals of operation are greater than two hours.

Starters shall be of the following type:

- Up to and including 4KW motor: Single phase on/off with overload protection (D.O.L.).
- Over 4 kW and up to 15 kW: Star Delta starter.
- For starters incorporating reduced voltage starting the changeover of voltage shall be automatic.

Terminals shall be accessible and shall be provided with adequate clearance between phases and between phases and earth. Where starters are not enclosed in a composite panel, an integral isolating switch as specified for control panels

shall be provided. Where electric motors are either not visible from the control panel or are located more than 10m distance they shall be provided with a local lock-off stop control circuit switch, or a main circuit isolator where there is no control circuit. A weatherproof lock-off stop control circuit switch shall be provided for motors located externally or otherwise exposed to the weather.

15.2 Motors

Motors shall comply with BS 816 Part 1 and shall be arranged for conduit entry.

Motors shall be fitted with locating type bearings and/or heavy thrust bearings at the non-driven and collar type at the drive end. Motors shall be of the totally enclosed fan cooled type, tropicalised to BS 5000 Part 99 suitably finished to resist corrosion by fluids or fumes. The rating of all motors shall be chosen to provide continuously the maximum power requirements of the plant. The motors shall be of the standard induction type. They may be of the squirrel cage, horizontal or vertical spindle type of all to the approval of the Engineer.

Vertical spindle type motors shall be provided with substantial canopies of approved design.

The locked rotor current shall be stated on the name plate of each motor and shall be not more than six times the full load current.

Thermistors shall be fitted to all motors above 5 kW. They shall be fitted during manufacture and their ends shall be brought out to additional terminals on the connector block of the motor.

All motors shall be rated 3 phases. 415 volt or single phase, 240 volt. high power factor continuous maximum rating complying with BS 5000 Part 99 and Class F insulation complying with BS 2757 unless otherwise specified. All motors larger than 4 kW shall be three phase.

All three phase motors shall be supplied with six stud terminals with each end of the stator phase windings connected, terminals shall be of suitable size to accept the cable lugs of the feeding cables. Terminal blocks shall be mounted on the side of the motor case in an approved box complete with lid, gasket and tapped ET entry hole.

Rubber installation shall not be used on coil connections. Each motor shall be fitted with cable terminals and glands to accept the specified types of cable.

No motor shall run at a speed higher than 1500 rpm unless otherwise specified. Motors driving through Vee-belts shall be fitted with slide rails. The power factor shall not be less than 0.9 lagging. All motors shall be from the same manufacturer as far as possible.

15.3 Cabling and Wiring

The Contractor shall carry out all power and control wiring including LV and ELV or any other voltage for the control equipment and alarm systems and interconnecting wiring between starter panels, remote control items, and motor units as required.

Cabling shall be carried out in PVC insulated, PVC sheathed, single wire armoured and PVC sheathed overall cable, using compression type glands provided with means of securing armoured wires within the body of the gland, under armour moisture seal and outer sheath seal.

Each core termination shall be fitted with a plastic ferrule engraved with an identification corresponding to the wiring diagrams.

Multicore control cables to the remote stop, start allow water cut-out/ alarms shall be 0.62mm² PVC SWAPVC where external to the pump station and PVC/PVC or similar, where internal. All cables, whether internal or external being suitably protected.

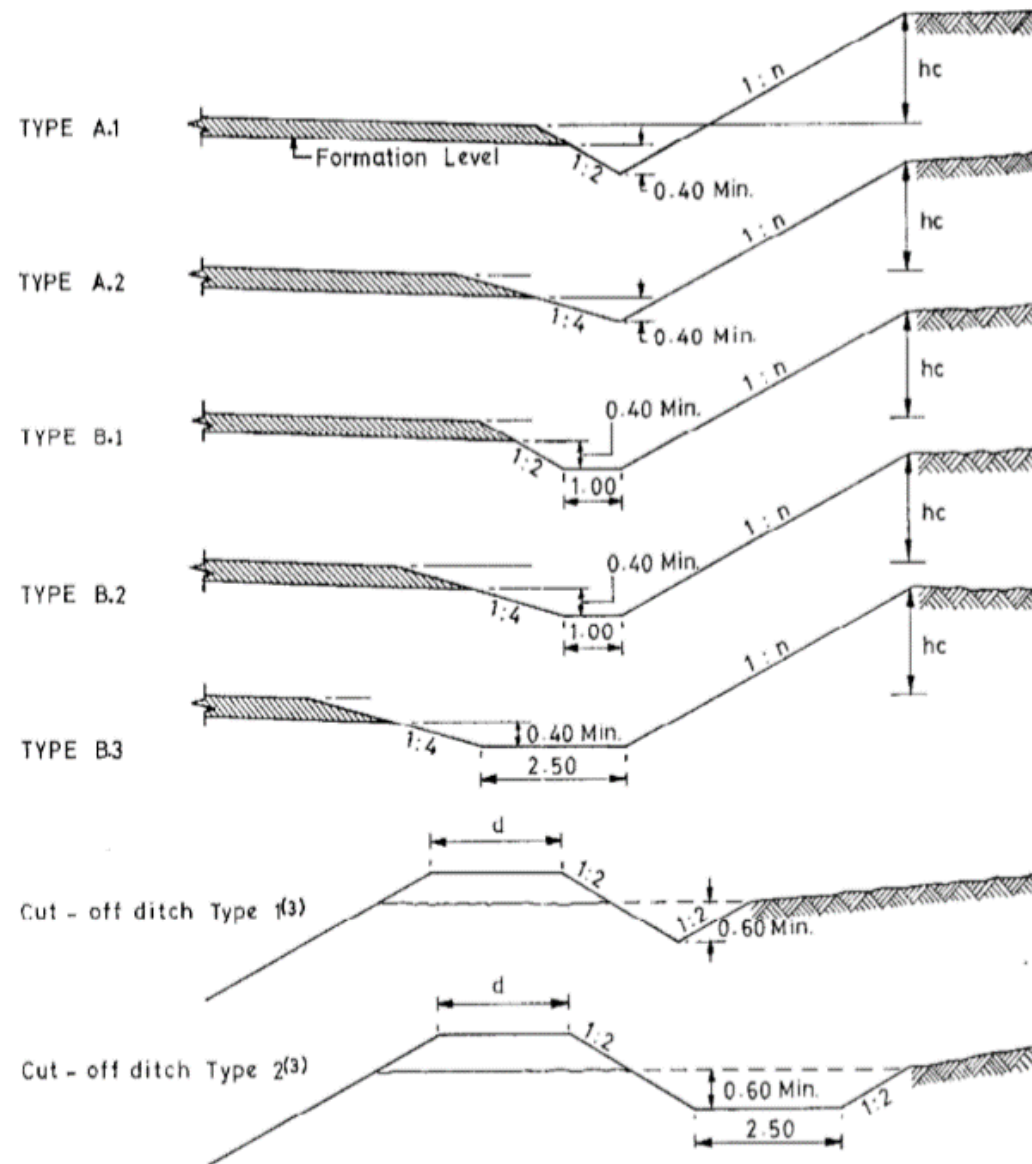
All conductors shall be copper and the installations, both internal and external being carried out in accordance with the regulations and by-laws previously stated. Trenching and the fixing of cables shall be in accordance with locally specified standards details of which have been specified within the subcontract documents for the electrical services. These details can be made available upon request should the Contractor not be familiar with these requirements.

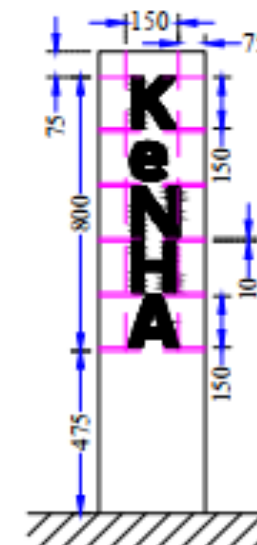
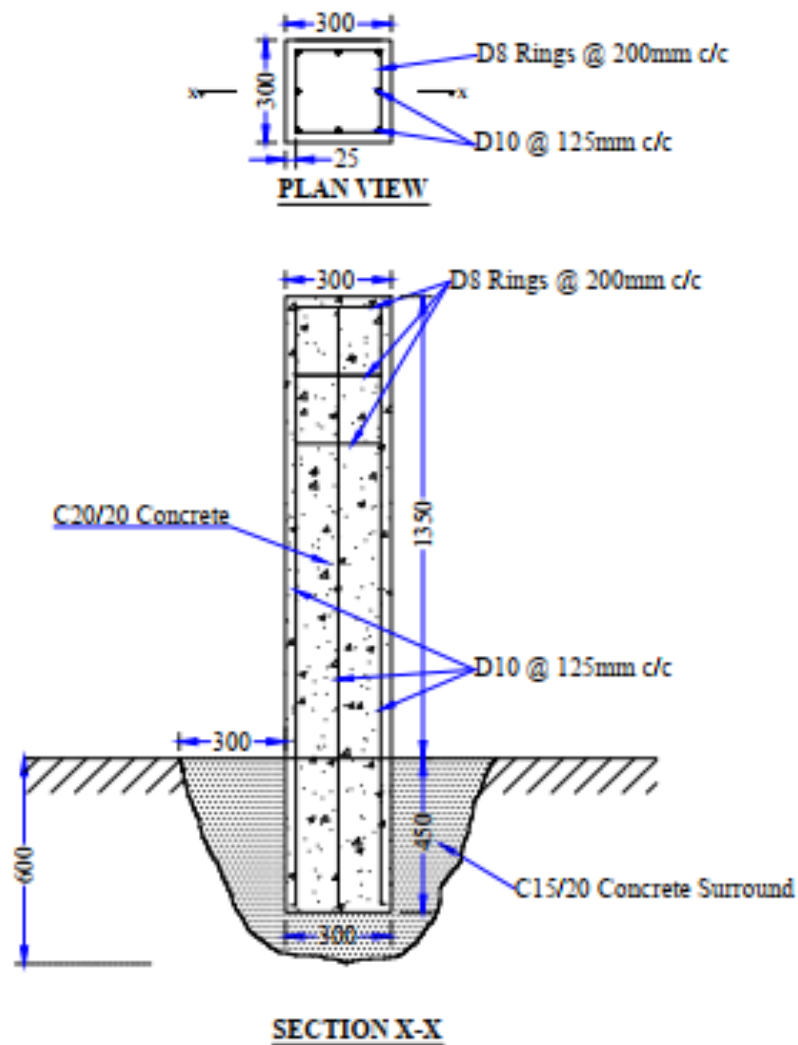
Details of the ratings, types and methods for all cables and wiring to be supplied under this sub-contract shall be submitted with the tenders, wiring, PVC single core shall be run in either galvanised conduit or galvanised trunking of suitable sizes where surface in plant rooms and heavy gauge PVC were cast into walls, slabs etc.

SECTION VIII - DRAWINGS

Note: A list of drawings should be inserted here including line diagrams and ARICS Report where applicable.
The actual drawings including Site plans should be annexed in a separate booklet.

SIDE DITCHES AND CUT OFF DITCHES





NOTE: The 'KeNHA' lettering shall be recessed by 10 mm

**MARKER POST LETTERING
(SIDE VIEW)**



DRAWING TITLE:

**ROAD RESERVE MARKER POST
DESIGN**

NOTES:

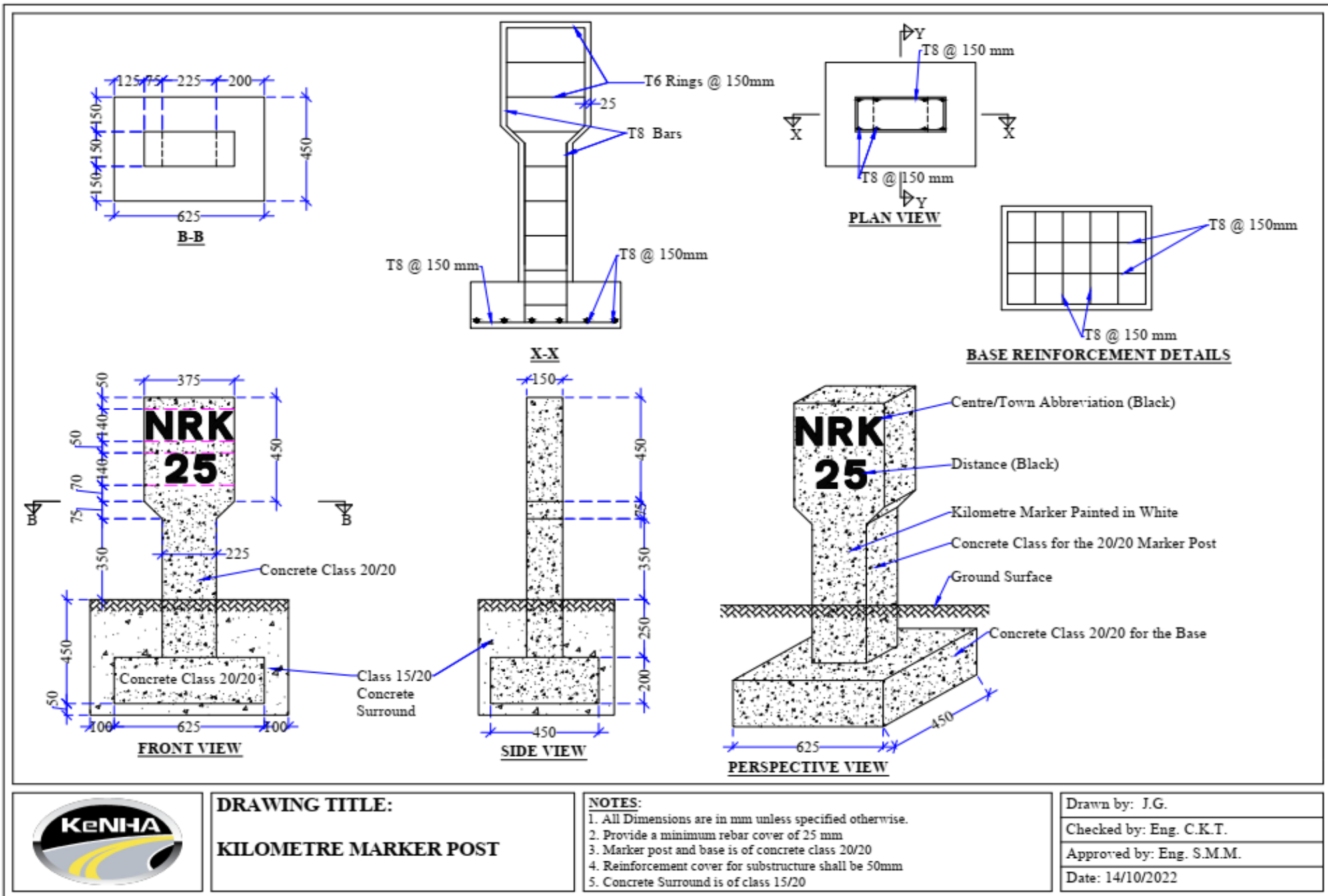
1. All Dimensions are in mm unless specified otherwise.
2. Provide a minimum rebar cover of 25 mm
3. Marker post is of concrete class 20/20
4. Concrete surround is of class 15/20

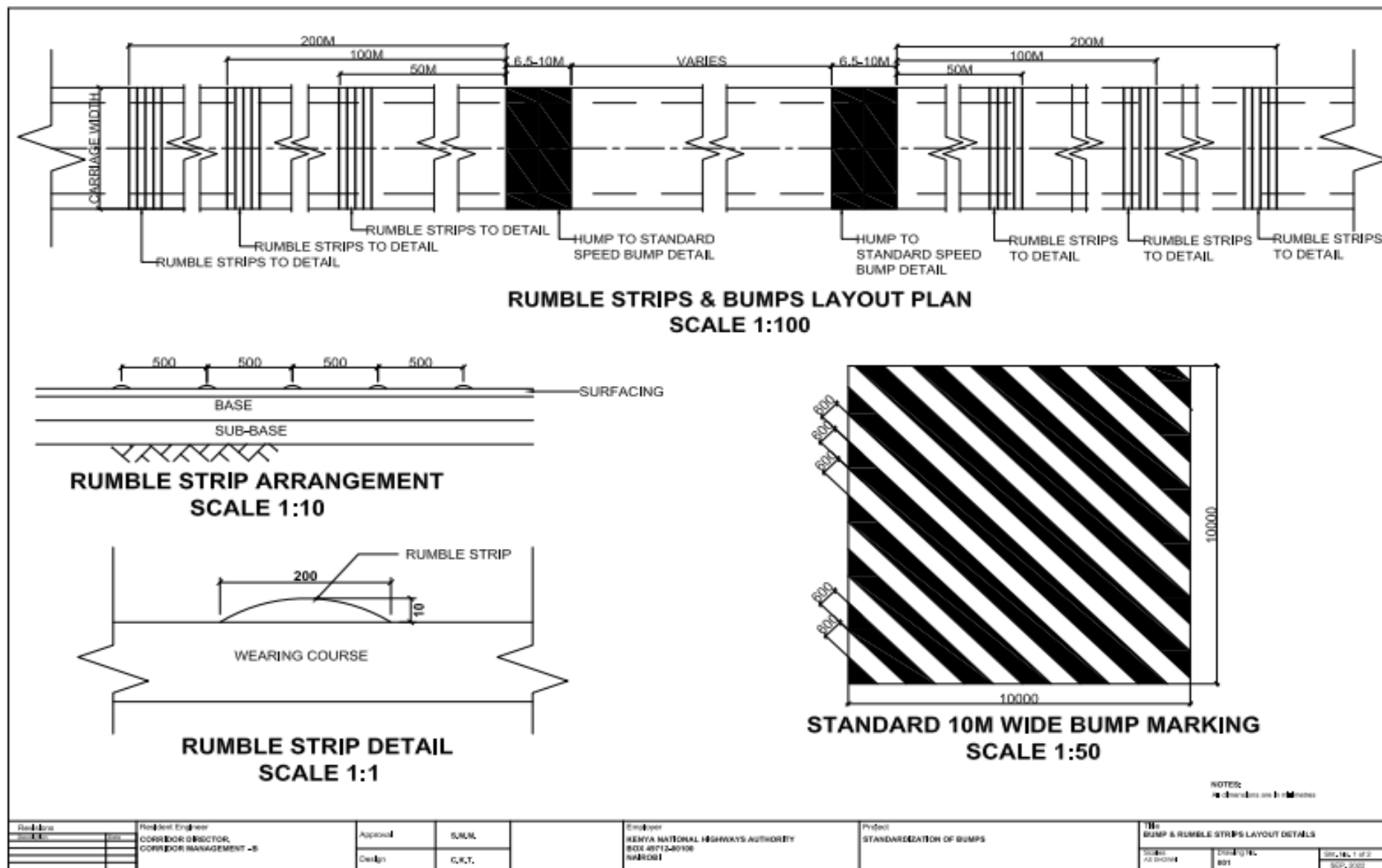
Drawn by: J.G.

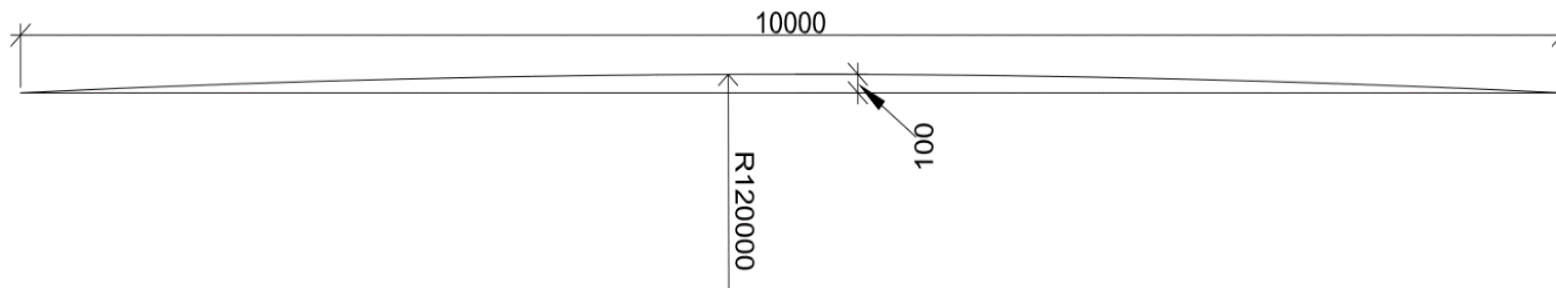
Checked by: Eng. C.K.T.

Approved by: Eng. S.M.M.

Date: 14/10/2022







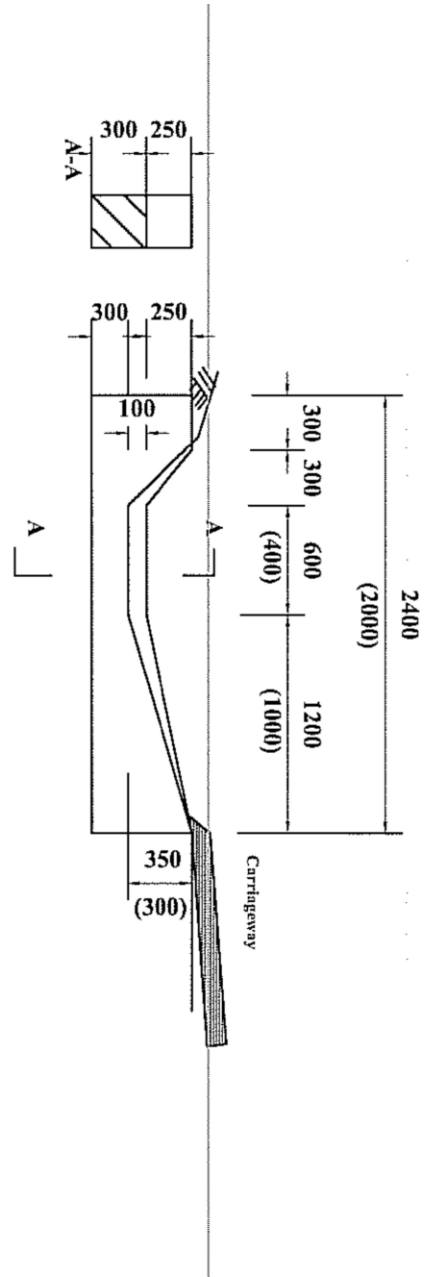
**STANDARD 10M WIDE BUMP
SCALE 1:20**

NOTES:
All dimensions are in millimetres

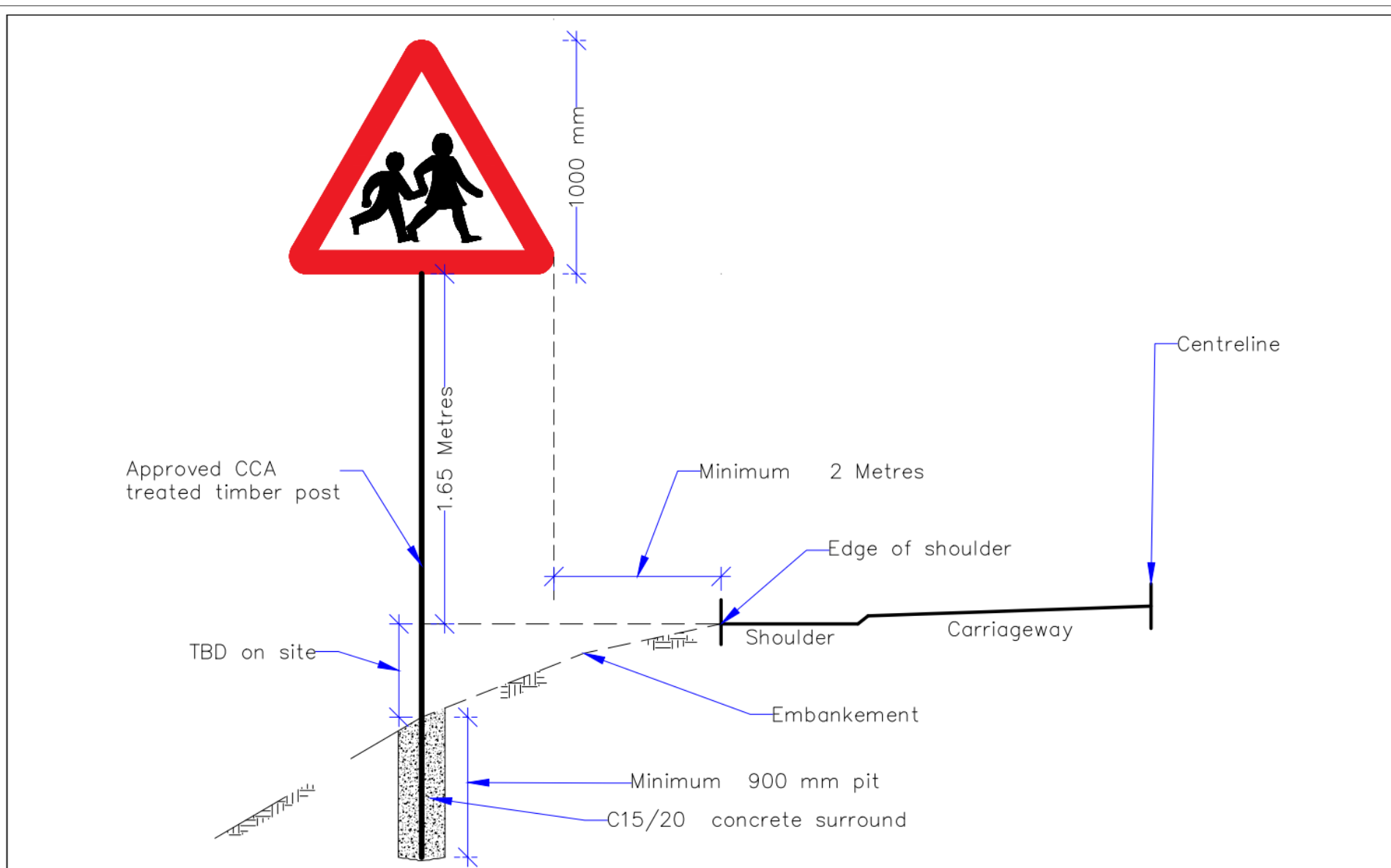
Revisions		Resident Engineer CORRIDOR DIRECTOR, CORRIDOR MANAGEMENT- B	Approval	S.M.M.	Employer KENYA NATIONAL HIGHWAYS AUTHORITY BOX 49712-00100 NAIROBI	Project STANDARDIZATION OF BUMPS	Title STANDARD 10M BUMP				
Description	Date										
			Design	C.K.T.							
							Scales AS SHOWN	Drawing No. 001	Sht. No. 2 of 2 SEP 2022		

Diagram illustrating a cross-section of a road drainage system. The central feature is a drainage ditch filled with stones, with a hatched vertical wall on its right side. Arrows indicate flow direction from both sides into the ditch. Labels include 'BACKSLOPE' for the upper slopes, 'SLOPE' for the lower slopes, and 'CARRIAGEWAY' for the road surface.

SECTION OF CONCRETE SCOUR CHECK



Cross-Section	Sizes in mm			Excav (m ³)	Concrete (m ³)	Apron stone pitching (m ³)
	Length	Width	Depth			
B	2000	100	500	0.10	0.09	0.14



DRAWING TITLE: SIGNS INSTALLATION GUIDE
CORRIDOR MANAGEMENT – B

NOTES

1. All Dimensions as indicated.
2. CCA treated posts should rest on earthen ground before placement of concrete surround.
3. Bolts used should be spot welded or threads damaged after installation.

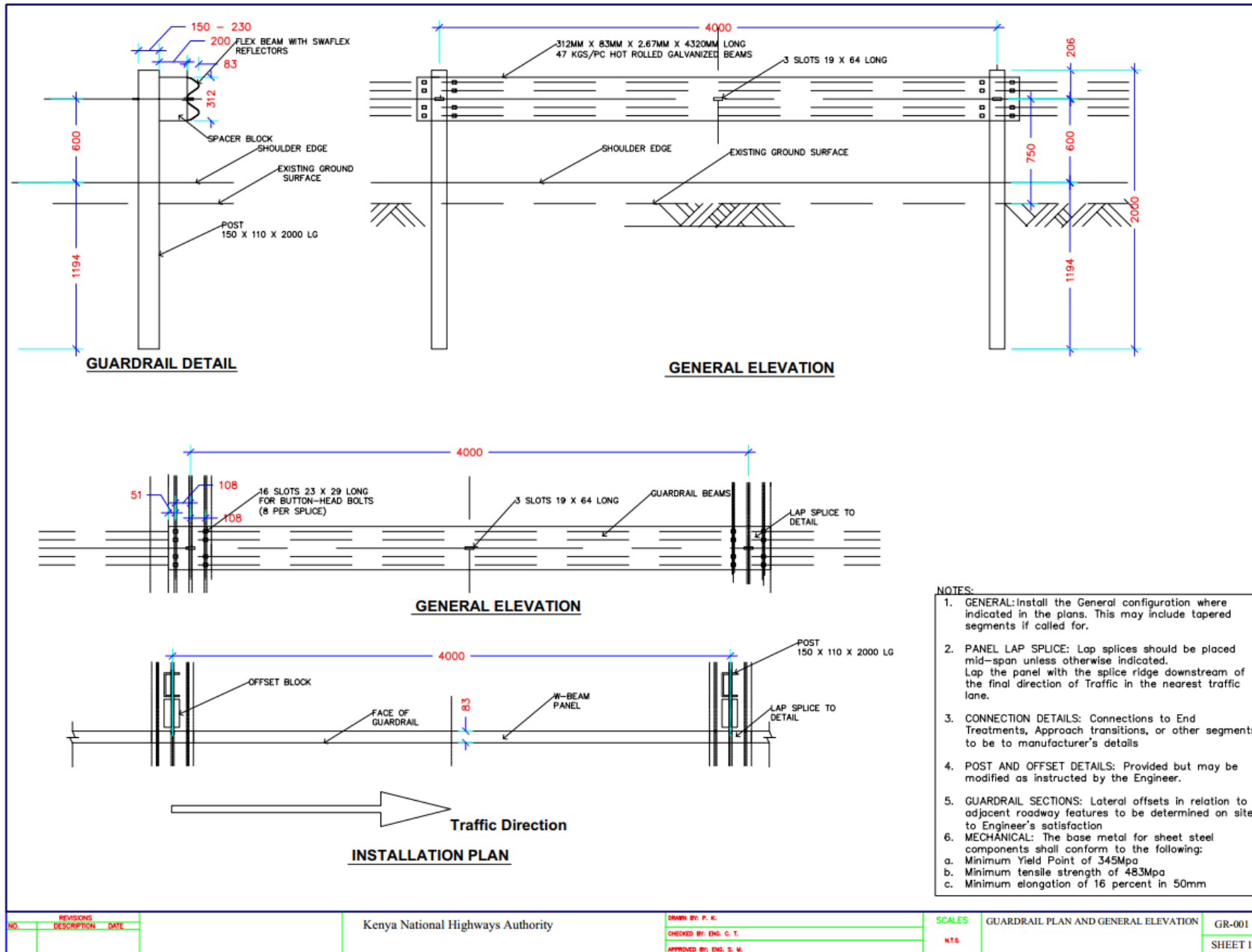
Designed & Drawn by: J.G

Checked by: C.K.T.

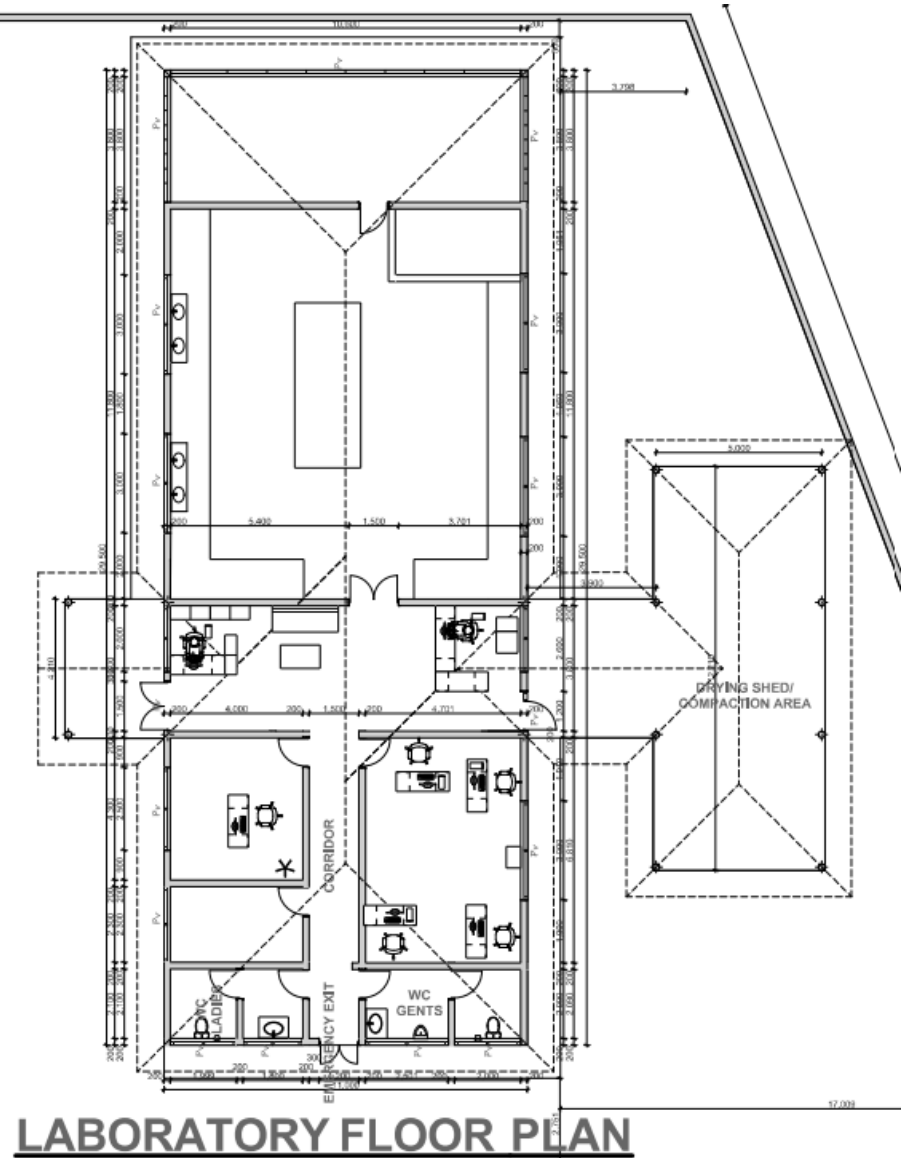
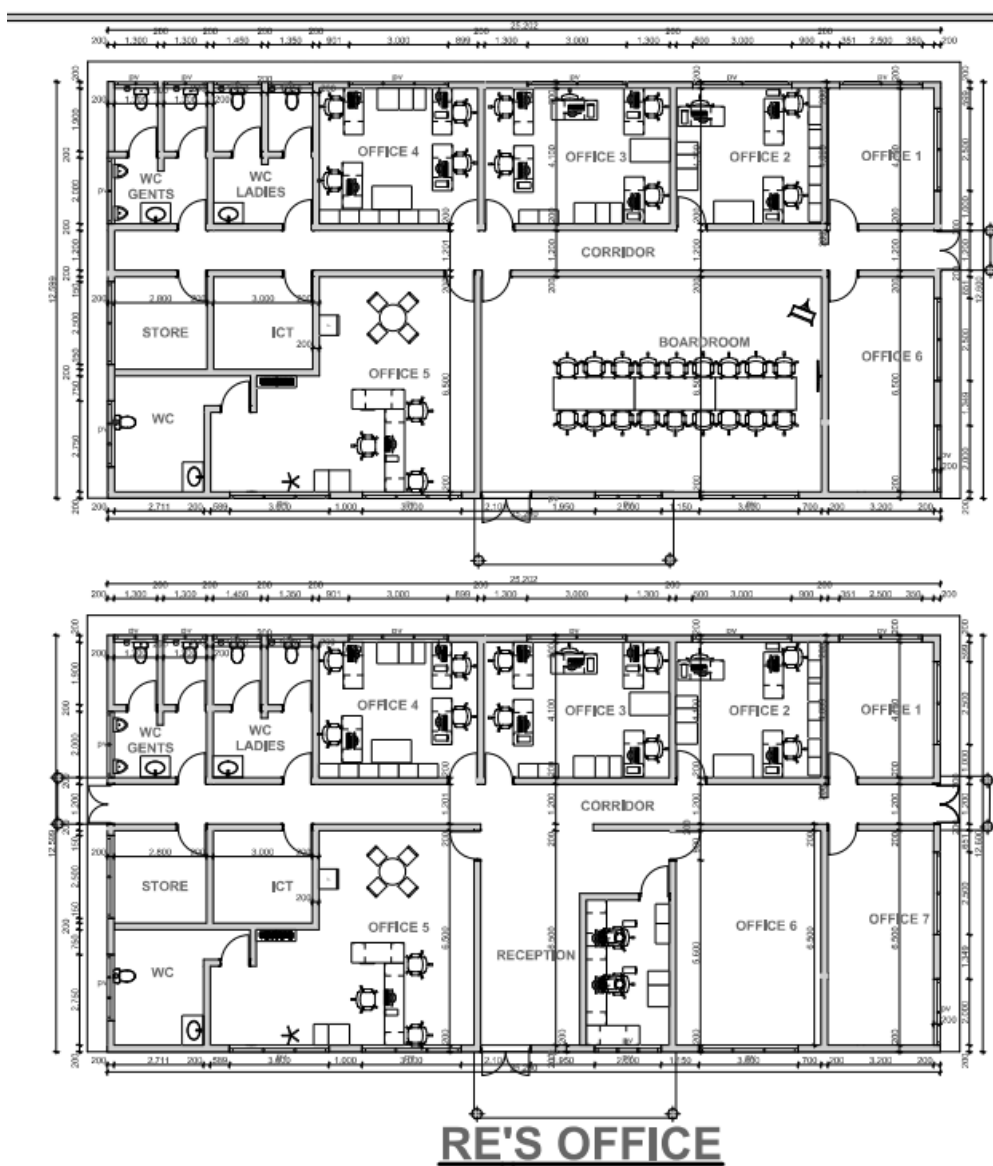
Approved by: S.M.M.

Date: 08/10/2024

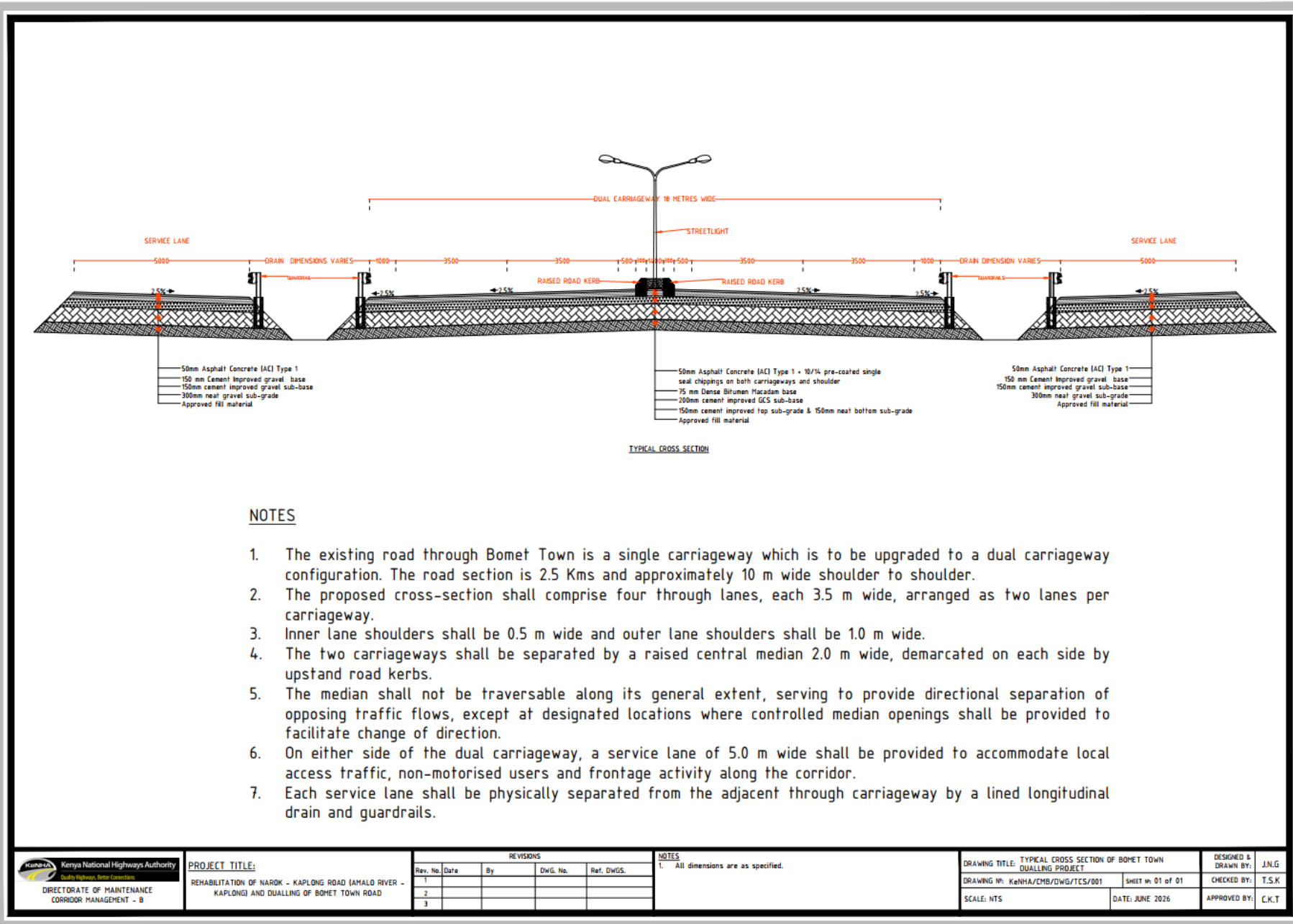
DRAWING FOR GUARDRAIL

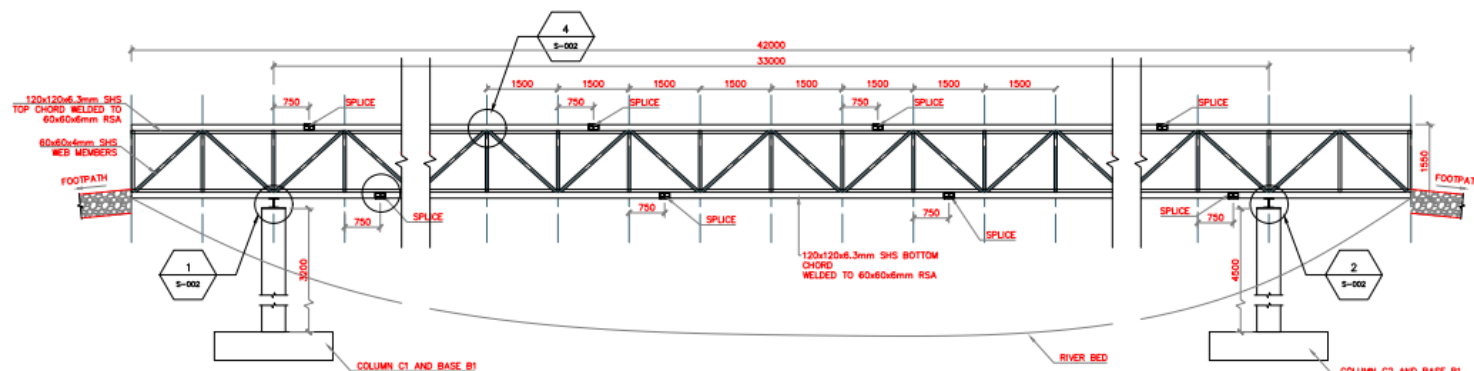


OFFICE BUILDING DRAWING

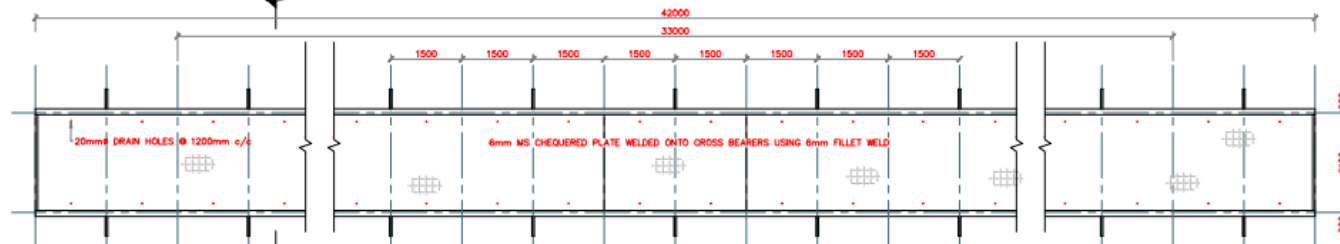


BOMET TOWN DUALLING TYPICAL CROSS SECTION

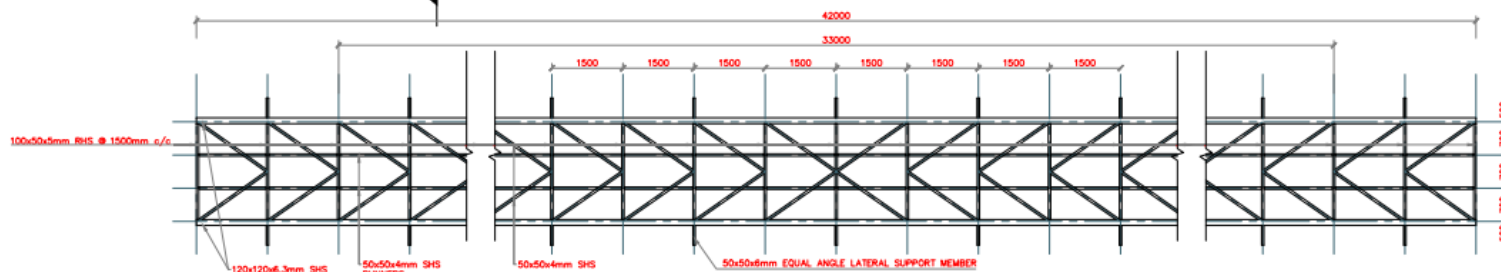




FOOTBRIDGE ELEVATION
SCALE 1:50

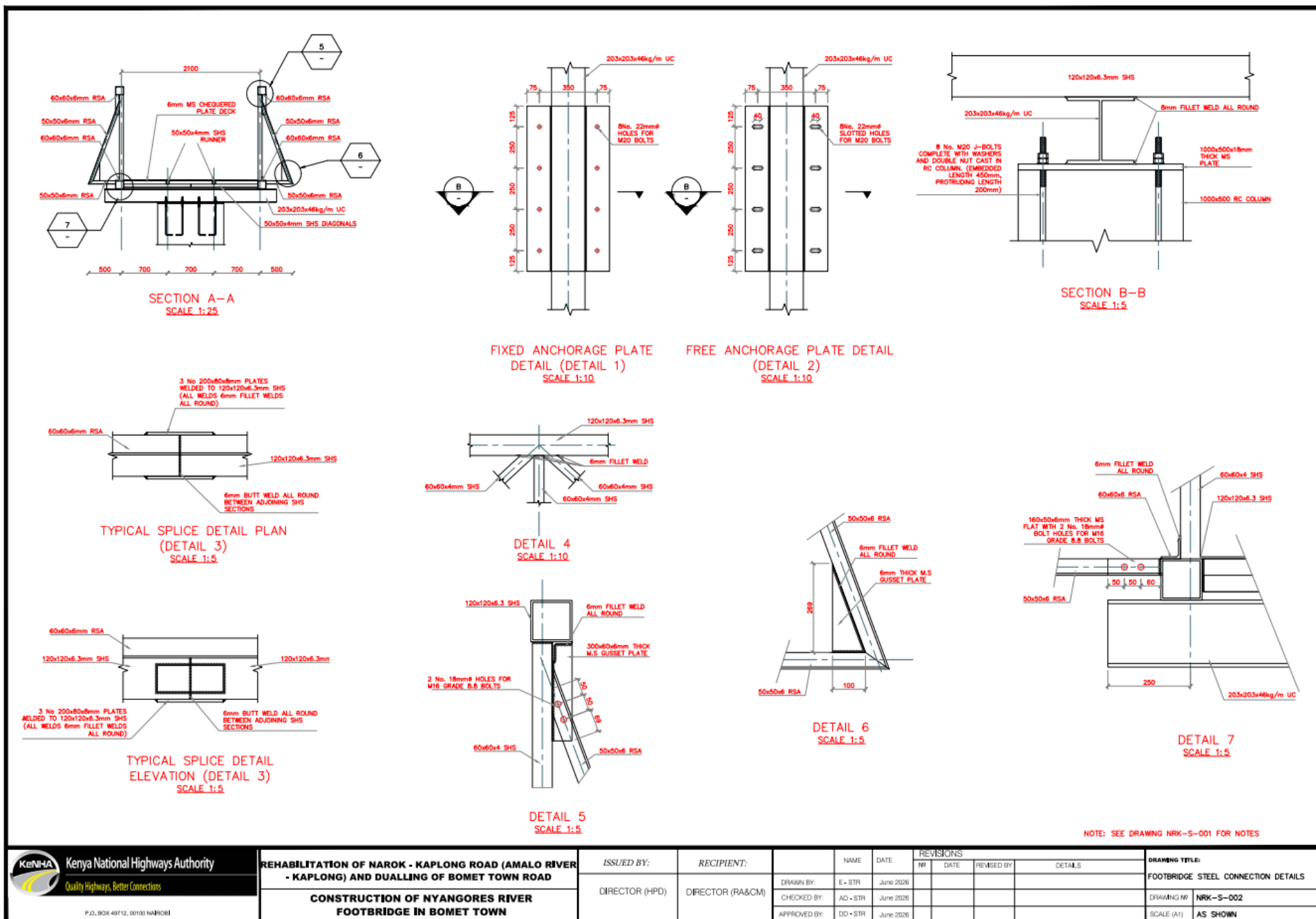


DECK TOP VIEW
SCALE 1:50



DECK BEARERS AND BRACING BOTTOM VIEW
SCALE 1:50

- GENERAL NOTES:**
- Only figured dimensions to be taken from this drawing.
 - This drawing is to be read in conjunction with other structural drawings.
 - All dimensions are in millimetres unless otherwise specified.
 - All structural steel to be Grade S355 to BS EN 10025-1:2004.
 - All welds to be 6mm fillet welds all round unless specified.
 - All structural steel to be hot dip galvanized.
 - Concrete cover to all reinforcement shall be 50mm.
 - High tensile ribbed reinforcement bars to BS 4449 are denoted by T.
 - All reinforcement to be approved by the structural Engineer.
 - Concrete strength shall be Class 30/37 for substructure.
 - All bolted connections to use grade 8.8 bolts with washers unless noted otherwise.
 - All joints shown as welded to be in continuous fillet weld to thickness specified on the drawings or other contract documents.
 - Connection details for all structural steelwork to be in accordance with Structural Engineers drawings, or contractor's shop drawings approved by the Structural Engineer.
 - Contractor shall submit shop drawings for approval of Structural Engineer prior to commencement of fabrication.
 - Protection of steel work shall comprise of the following as a minimum, unless indicated otherwise:
 - 15.1. Surface preparation by blast cleaning, pickling process or where approved by wire brushing.
 - 15.2. Application of one coat of an approved pre-fabrication primer e.g. zinc chromate, red oxide or similar approved by the Structural Engineer.
 - 15.3. Application of one coat of approved primer after fabrication.
 - 15.4. Two coats of an approved paint system, one applied in the shop and the other applied on site after erection.
 - All open ends of SHS, RHS and CHS sections shall be blocked with 3mm thick plates unless noted otherwise.
 - All mild steel bolts, washers and nuts shall comply with the requirements of BS 4190.
 - High Strength Friction Grip (HSFG) bolts shall conform to BS 4395 and their use shall follow provisions of BS 4604.
 - The Contractor shall be responsible of accurate positioning, leveling and plumbing of all approved drawings and to the satisfaction of the Engineer.
 - All steel section shall be true to size and of wind. Particular care must be taken when welding to avoid distortion of hollow steel sections, plates and angles.
 - All steelwork shall be inspected by the Engineer at the fabrication workshop before being dispatched to site.
 - All holding down bolts shall be of grade 8.8 and to the dimensions shown on the drawings unless noted otherwise.
 - Holding down bolts shall be set in position to dimensions indicated on the drawings by means of pre-fabricated templates and shall be securely fixed in position to prevent displacement during concreting.
 - Unless specified otherwise, holding down bolts shall be protected against corrosion by surface preparation similar to steelwork and galvanized to the approval of the Structural Engineer.



Kenya National Highways Authority
Quality Highways, Better Connections

P.O. BOX 49712, 00100 NAIROBI

REHABILITATION OF NAROK - KAPLONG ROAD (AMALO RIVER - KAPLONG) AND DUALLING OF BOMET TOWN ROAD

CONSTRUCTION OF NYANGORES RIVER FOOTBRIDGE IN BOMET TOWN

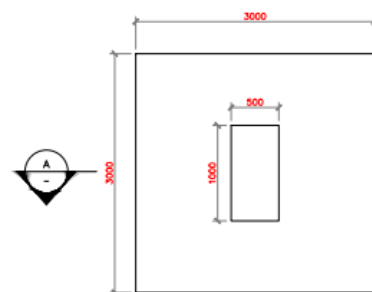
ISSUED BY:

DIRECTOR (HPD)

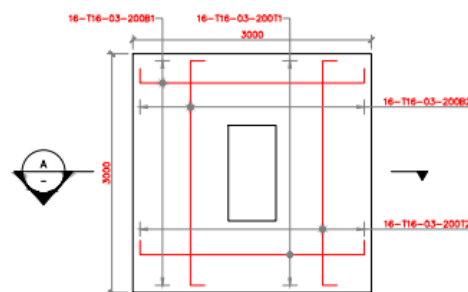
RECIPIENT:

DIRECTOR (RA&CM)

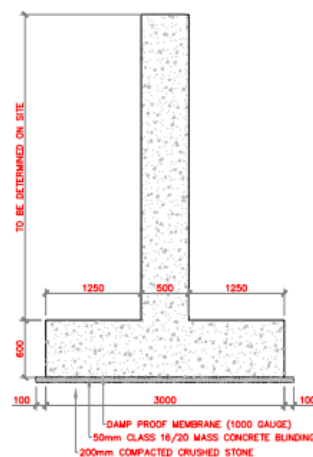
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			NO	DATE	REVISED BY	DETAILS	
DRAWN BY:	E - STR	June 2026					FOOTBRIDGE STEEL CONNECTION DETAILS
CHECKED BY:	AD - STR	June 2026					
APPROVED BY:	DD - STR	June 2026					
DRAWING NO							NRK-S-002
SCALE (A1)							AS SHOWN



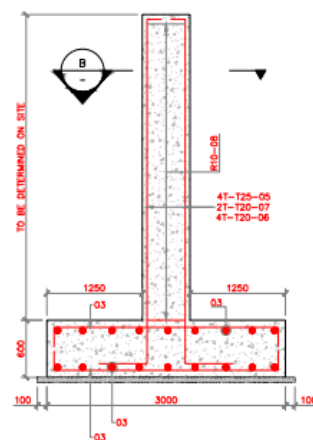
FOUNDATION PLAN-(2 No.)
SCALE 1:25



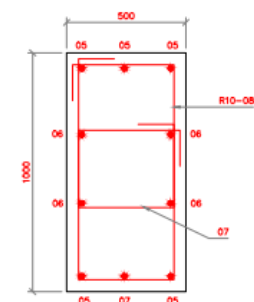
FOUNDATION RC DETAILS PLAN-(2 No.)
SCALE 1:25



SECTION A-A
SCALE 1:25



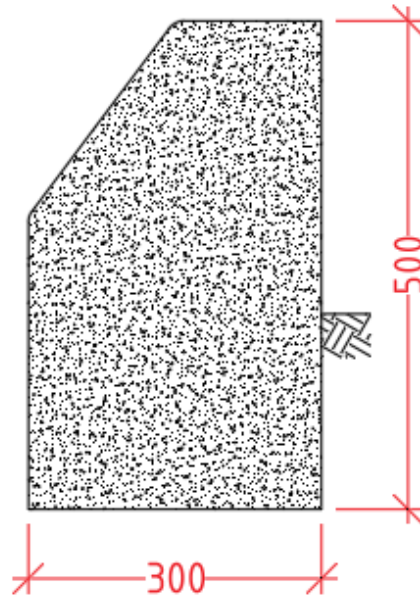
SECTION A-A RC DETAILS
SCALE 1:25



SECTION B-B
SCALE 1:10

NOTE: SEE DRAWING NRK-S-001 FOR NOTES

 Kenya National Highways Authority <i>Quality Highways, Better Connections</i> P.O. BOX 49712, 00100 NAIROBI	REHABILITATION OF NAROK - KAPLONG ROAD (AMALO RIVER - KAPLONG) AND DUALLING OF BOMET TOWN ROAD CONSTRUCTION OF NYANGORES RIVER FOOTBRIDGE IN BOMET TOWN	ISSUED BY: DIRECTOR (HPD)	RECIPIENT: DIRECTOR (RA&CM)	REVISIONS						DRAWING TITLE: SUBSTRUCTURE RC DETAILS DRAWING NO: NRK-S-003 SCALE (AT): AS SHOWN
				NAME	DATE	NO	DATE	REMOVED BY	DETAILS	
				DRAWN BY:	E - STR	June 2026				
				CHECKED BY:	AD - STR	June 2026				
				APPROVED BY:	DD - STR	June 2026				



RAISED ROAD KERB DETAILS

ROAD CONDITION SURVEY - SUMMARY SHEET - PAVED										KeNHA - Corridor B					RCSS-PR	
COUNTY: BOMET										REGION: CORRIDOR B						
ROAD NO: B7			ROAD NAME: KAPLONG-BOMET-AMALA RIVER							ROAD LENGTH (km): 55KM						
Sheet No.	Length Km	AVERAGE IRI VALUE (Rate of Detororiation) (Scale 0-10)				Shoulder grading	CULVERTS						PRIORITY FOR SPOT IMPROVEMENT			
							N	RR	HR	NH	G	B	SHOULDER REHAB.	SPOT RESEALING	STRUCTURES INCL. PROTECTION WORKS	
1	5		2.61034				0	0	0	0	8	29	1) Ch:	1) Ch:	1) Ch: 75+000	
2	5		2.2596				0	0	0	0	0	26				
3	5		2.75275				0	0	0	0	0	27				
4	5		2.15529				0	0	0	0	3	20	2) Ch:	2) Ch:	2) Ch: 95+800	
5	5		2.9007				1	0	0	0	1	22				
6	5		3.40897				0	0	1	0	0	40				
7	5		2.60951				0	0	0	0	6	30	3) Ch:	3) Ch:	3) Ch:	
8	5		2.9115				1	0	0	0	0	34				
9	5		2.78695				6	0	0	0	0	28				
10	5		2.22914				1	0	0	0	0	43	4) Ch:	4) Ch:	4) Ch:	
11	4		2.16181				1	0	0	0	9	28				
Σ km	54	0	2.61696	0	0	0	Σ No	10	0	1	0	27	327			
ROAD KM: 54 KM																
Σ %		0	0.04811	0	0	0	Maintainable Σ(1-3)			100			Average Rate of Deterioration: 2.62			
POSSIBLE ENVIRONMENTAL PROJECTS IN THIS ROAD :																

PART 3 – CONDITIONS OF CONTRACT AND CONTRACT FORMS

SECTION IX CONDITIONS OF CONTRACT, PART I -GENERAL CONDITIONS

SECTION VIII CONDITIONS OF CONTRACT PART I: GENERAL CONDITIONS OF CONTRACT

Red Book:

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The Conditions of Contract are the “General Conditions” which form part of the “Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (“Red book”) First Edition 1999” published by the Federation Internationale Des Ingenieurs – Conseils (FIDIC) and the following “Particular Conditions” which comprise of the amendments and additions to such General Conditions.

An original copy of the above FIDIC publication i.e. “*Conditions of Contract for Building and Engineering Works Designed by the Employer*” must be obtained from FIDIC.

International Federation of Consulting Engineers (FIDIC)

FIDIC Bookshop – Box- 311 – CH – 1215 Geneva 15 Switzerland		
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Email	:	fidic@fidic.org
www.fidic.org http://www.fidic.org/		
FIDIC code: ISBN 2 – 88432 – 022 - 9		

SECTION X CONDITIONS OF CONTRACT, PART II -CONDITIONS OF PARTICULAR APPLICATION

SECTION IX: CONDITIONS OF CONTRACT PART II: (CONDITIONS OF PARTICULAR APPLICATION)

The following Special Provisions shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract. The Particular Condition is preceded by the corresponding clause number of the General Condition of Contract to which it relates.

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1 SUB-CLAUSE 1.1: DEFINITIONS

Amend these sub-clause as follows:

1.1.1.3 Amend the paragraph by adding the following: Letter of Acceptance is synonymous with Notification of Award.

1.1.1.4: Amend the paragraph by adding the following words at the end: The words Letter of Tender is synonymous with Form of Tender.

1.1.1.7: Insert in line 4 after the prices”, the following, “entered by the Contractor (whether or not such rate be employed in computation of the Accepted Contract Amount),”

1.1.1.8: Amend the paragraph by adding the following words at the end:

The word “Tender” is synonymous with “bid”

1.1.1.9 Amend the paragraph by adding the following words at the end: The words Appendix to Tender or Appendix to Form of Tender is synonymous with Contract Data.

1.1.2.5 Amend the paragraph by adding the following words at the end: The words Contractor’s representative is synonymous with Site Agent or Road Manager.

2 SUB-CLAUSE 1.4: LANGUAGE AND LAW

Insert:

The Contract shall be drawn up in the ENGLISH LANGUAGE. Communication between both Parties shall be in this given language.

The Laws applicable to this Contract shall be the Laws of the Republic of Kenya.

SUB-CLAUSE 1.5: PRIORITY OF DOCUMENTS

Delete the documents listed (a) – (h) and substitute with the following:

- a) The Contract Agreement (if completed)
- b) The Letter of Acceptance
- c) The Form of Tender
- d) Appendix to Form of Tender
- e) The Particular Conditions
- f) These General Conditions
- g) The Special Specifications
- h) The Standard Specification for Road and Bridge Construction, 1986
- i) The PBC Guidelines Edition 1.1 of February 2016
- j) Road Maintenance Manual, May 2010 Edition and Performance Based Contract Manuals.
- k) The Drawings;
- l) The priced Bills of Quantities
- m) Other documents forming part of the Contract

SUB-CLAUSE 1.6: CONTRACT AGREEMENT

Replace the first sentence of the first paragraph with:

The parties shall sign a Contract Agreement within the period stipulated in the Appendix to Tender.

3 SUB-CLAUSE 3.1: ENGINEER'S DUTIES AND AUTHORITY

With reference to Sub-Clause 3.1, the following shall also apply:

The Engineer shall obtain the specific approval of the Employer before taking any of the following actions:

- d) Consenting to the subcontracting of any part of the works under Clause 4.4
- e) Determining an extension of time under Sub-clause 8.4
- f) Certifying additional cost determined under Clause 12
- g) Issuing a Variation under Clause 13

4 SUB-CLAUSE 4.2: PERFORMANCE SECURITY

Replace the text of the first and second Paragraph under Sub-clause 4.2 with the following:

“The Contractor shall provide the Performance Security to the Employer within 28 days after receipt of the Letter of Acceptance. The Performance Security shall be in the form of a bank guarantee as stipulated by the Employer in the Appendix to Tender. The Performance Security shall be issued by a bank incorporated in Kenya. The Contractor shall notify the Engineer when providing the Performance Security to the Employer.

Replace the text of the first sentence under the third paragraph under Sub-clause 4.2 with the following:

The Contractor shall ensure that the Performance Security is valid and enforceable until a date 28 days after the date of issue of the Performance Certificate.

5 Add the following after the fifth paragraph:

The Employer shall be at liberty to claim part or the entire performance Security without informing or notifying the Contractor provided that the conditions necessitating the claim are contractual.

SUB-CLAUSE 4.3: CONTRACTOR'S REPRESENTATIVE

Add the following at the end of the second paragraph:

The Contractor's Agent or Representative on the site shall have a minimum qualification of a Registered Professional Engineer (Highways), BSc in Civil Engineering, have a Current / Valid Registration by EBK and shall be able to read and write English fluently.

The Contractor shall also submit a specimen signature of his proposed Site Agent /Road Manager who **SHALL** be the only signatory to payment of certificates/Monthly statements from the Contractor.

6 SUB-CLAUSE 4.4: SUBCONTRACTORS

Add after paragraph one the following:

The maximum allowable accumulated value of work subcontracted shall be as stated in the appendix to form of tender.

7 SUB-CLAUSE 4.8: SAFETY PROCEDURES

Add:

Notwithstanding the Contractor's obligation under Sub-Clause-paragraph (a) – (g) of Sub-Clause 4.8 of the Conditions of Contract, the Contractor shall observe the following measures with a view to enhance Road Safety to the Road Users and Site Workers:

1. Prepare and submit a comprehensive Road Safety Implementation Plan within 28 days after receipt of Order to Commence for the Engineer's Approval. The plan shall include but not limited to the following:
 - Night driving
 - Safety of workers
 - Diversions
 - Traffic management Plan
 - Towing of stalled vehicle
2. The Contractor should identify, evaluate and monitor potential traffic and road safety risks to workers and road users throughout the Contract life cycle and develop measures and plans to address them.
3. The Contractor shall install and maintain standard approved traffic warning signs, directional signs, secure the working areas and deploy flagmen at active construction sites.
4. The Contractor shall assess each phase of the works, monitor incidents and accidents indicating the mitigation measures undertaken and prepare monthly reports to be submitted to the Resident Engineer.
5. The Contractor shall factor the cost of implementation of the Road Safety Plan in the rates for the Works.

Failure by the Contractor to observe the above safety features shall be deemed to be a violation of the Contractor's Obligations and shall be grounds for Suspension and/or Termination.

8 SUB-CLAUSE 4.18: PROTECTION OF THE ENVIRONMENT

Add:

Notwithstanding the Contractor's obligation under Sub-Clause-paragraph (a), (b) and (c) of Sub-Clause 1 of 4.18 of the Conditions of Contract, the Contractor shall observe the following measures with a view to reducing or elimination adverse environmental effects by the site works:

1. All quarries and borrow pits shall be filled and landscaped to their original state after extraction of construction material
2. Soil erosion due to surface runoff or water from culverts or other drainage structures should be avoided by putting in place proper erosion control measures that shall include, but are not limited to grassing and planting if trees
3. Long traffic diversion roads shall be avoided so as to minimize the effect of dust on the surrounding environment. In any case all diversions shall be kept damp and dust free
4. Spillage of oils, fuels and lubricants shall be avoided and if spilt, shall be collected and disposed of in such a way as not to adversely affect the environment
5. Rock blasting near settlement areas shall be properly coordinated with the relevant officers of the Government so as to minimize noise pollution and community interference.

9 SUB-CLAUSE 6.1: ENGAGEMENT OF STAFF AND LABOUR

Add the following at the end of clause 6.1:

The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labour with appropriate qualifications and experience who are Kenya citizens.

Any additional unskilled labour which is required by the Contractor for the works, and which is not in his employment schedule at the time of the acceptance of the Tender shall be recruited by the Contractor from the Labour Exchange or Exchange or Exchanges nearest to the site or sites of the work.

10 SUB-CLAUSE 6.5: WORKING HOURS

Add at the end of Sub-Clause 6.5 the following:

If the Contractor requests permission to work by night as well as by day, then if the Engineer shall grant such permission the Contractor shall not be entitled to any additional payments for so doing. All such work at night shall be carried out without unreasonable noise or other disturbance and the Contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out night work and from and against all claims, demands, proceedings, costs, charges and expenses whatsoever in regard or in relation to such liability.

In addition, the Contractor will be required to provide, for any work carried out at night or recognized days of rest, adequate lighting and other facilities so that the work is carried out safely and properly.

In the event of the Engineer granting permission to the Contractor to work double or rotary shifts or on Sundays, the Contractor shall be required to meet any additional costs to the Employer in the administration and supervision of the Contract arising from the granting of this permission.”

11 SUB-CLAUSE 6.7: HEALTH AND SAFETY

Add under the first paragraph:

The Contractor shall compensate for loss of damage suffered in consequence of any accident or injury or disease resulting from his work to any workman or other person in the employment of the Contractor or any Subcontractor is in accordance with the Workmen’s Compensation Act of the Laws of Kenya

The Contractor shall ensure adequate safety program with respect to all work under the contract is complied with, whether performed by the Contractor or subcontractor is formulated and enforced. additionally, all records of health, safety and welfare shall be maintained as the Engineer may from time to time prescribe. Reports of accidents shall be submitted to the Engineer.

Add after the last paragraph:

In addition, the Contractor shall notify the Engineer and any relevant Authority the occurrence of these accidents

12 SUB-CLAUSE 7.4 TESTING

Add at the end of Sub-Clause 7.4 the following:

The Contractor shall submit to the Engineer, Project Specific Quality Management Plan for approval 28 days after issuance of order to commence. The Plan shall include but not limited to:

1. Key staff that will be involved in the project and their role in quality management
2. Resources (Human and machinery) and Resource allocation in quality management

3. Processes and procedures to be followed in quality management
4. Controls to be put in place to ensure that the quality management plan is adhered to.
5. Reporting methodology on quality Management
6. Methodology on inspection, testing, monitoring and measuring to ensure conformity to quality requirement in accordance with the contract.
7. Description on correction action to be undertaken on non-conforming outputs and corrective action to avoid recurrence.

SUBCLAUSE 8.3: PROGRAMME

Replace the text of Sub-clause 8.3 with the following:

Within the date mentioned in the Appendix to the Form of Bid of the date of the Letter of Acceptance, the Contractor shall submit to the Engineer for consent a detailed Programme showing the order, procedure, and method for carrying out the Works. The Programme shall include:

The Contractor's methodology and arrangements for executing the Works, including plant, manpower, resources, and temporary works.

- A detailed Construction Schedule (Level 4 Programme) developed using Primavera Project Planner.
- A Progress Curve/Project Cash Flow.
- A Critical Resources Usage Chart.
- A Detailed Method Statement.
- A Schedule of Submittals and Shop Drawings.
- Any other details as specified by the Engineer.

The submission and consent of the Programme shall not relieve the Contractor of any duties or responsibilities under the Contract.

If the Contractor fails to submit the Programme or a revised Programme within **28 days**, the Employer may deduct **Kshs. 50,000 per day** as liquidated damages until the Programme is submitted.

The Contractor shall programme, coordinate, and phase all Works, including those of other contractors if any, to ensure compliance with the Contract completion dates.

The Engineer may instruct the Contractor to amend the Programme to reflect site conditions. The Contractor shall comply with such instructions within **14 days**.

The Programme shall be in Critical Path Method (CPM) format, identifying critical activities and showing the relationship between early and late start/finish dates. The Programme shall align with the specified Project end date.

The Contractor shall bear all expenses and responsibility for delays resulting from its failure to prepare, provide, or approve the Programme.

The Contractor shall provide monthly progress reports, including:

- An annotated copy of the current Programme, indicating progress achieved.
- A description of actions taken to address delays and maintain the construction schedule.

The Project float, defined as the time between early and late start/finish dates of any activity in the approved Programme, is jointly owned by the Employer and the Contractor.

If the actual progress of the Works does not conform to the approved Programme, the Contractor shall, within 14 days of the Engineer's request, submit a revised Programme showing modifications necessary to ensure completion within the Time for Completion.

If the Contractor falls behind schedule, it shall take steps to improve progress and submit revised Programmes demonstrating compliance with Milestone dates, without additional cost to the Employer.

Failure to comply with this Sub-clause, following written notice from the Engineer, shall entitle the Employer to enforce this requirement.

The Contractor shall submit a detailed Cash Flow Estimate together with the PoW of receiving the Letter of Acceptance. Any resubmission required shall be made within **14 days** of the Engineer's written notice.

The Cash Flow Estimate shall include:

- A Progress Curve/Projected Cash Flow developed using Primavera Project Planner.
- An S-Curve showing cumulative progress of work done (in % of work) against time (in weeks).

Failure to comply with this Sub-clause, following written notice from the Engineer, shall entitle the Employer to enforce this requirement through the “**Penalty for Delay**” provision.

The Contractor shall submit the following reports during the execution of the Works:

- The number of personnel by craft and major equipment utilized.
- Weather conditions (maximum/minimum temperatures, humidity, rainfall).
- Weekly report before the weekly site meeting, including: Project status, safety, and environmental control.
- Monthly report, including: Executive summary, detailed progress, budget, and cash flow & photographs of the Works.

For unjustifiable delay in submission, the Employer may deduct **Kshs. 50,000** per day as liquidated damages.

The Contractor shall allow in his programme all published Kenya public holidays including but not limited to the following per calendar year during which the Contractor shall not be permitted to work.

- New Year's Day (1st January)
- Good Friday
- Easter Monday
- Idd ul fitr
- Labour Day (1st May)
- Madaraka Day (1st June)
- Mazingira Day (10th October)
- Mashujaa Day (20th October)
- Jamhuri day (12th December)
- Christmas Day (25th December)
- Boxing Day (26th December)

The Contractor shall also allow per calendar year for a further 3 unspecified public holidays which may be announced by the Government of Kenya with no prior notification upon which he shall not be permitted to work.

13 SUBCLAUSE 8.7: DELAY DAMAGES

Add the following paragraphs at the end of this Sub-Clause:

“There shall be no reduction in the amount of liquidated damages in the event that a part or a section of the Works within the Contract is certified as completed before the whole of the Works comprising that Contract.

The Employer shall **NOT** pay any bonus for early completion of the Works to the Contractor.

14 SUBCLAUSE 11.1: COMPLETION OF OUTSTANDING WORK AND REMEDYING DEFECTS

Add:

At the expiry of the Defects Notification Period, no defect arising from the permanent works existing shall be acceptable for taking over. The Employer shall verify and satisfy themselves that all the outstanding works and defects arising out of the works have been attended to sufficiently. Works shall also be inspected at the End of Defects Notification Period.

15 SUBCLAUSE 13.1: RIGHT TO VARY

Add the following paragraph at the end of subclause 13.1:

No such variations in any way shall contravene the requirements of Public Procurement and Disposal Act of 2015 and the amendments thereof.

16 SUB-CLAUSE 14.8: DELAYED PAYMENT

Replace the second paragraph with:

In the event of the failure of the Employer to make payment within the times stated, the Employer shall make payment to the Contractor of simple interest at a rate equal to two percentage points above the mean Base Lending Rate obtained from the Central Bank of Kenya. The provisions of this subclause are without prejudice to the Contractor's entitlements under subclause 16.2 or otherwise.

17 SUB-CLAUSE 14.15: CURRENCIES OF PAYMENT

The paragraphs are substituted with;

The Contract Price shall be designated in the Kenyan Shillings.

All work performed by the Contractor under the Contract shall be valued in Kenya Shillings using the rates and prices entered in the Bills of Quantities together with such other increases to the Contract Price including variation of price payments in accordance with Clause 13.

18 SUB-CLAUSE 18.1 GENERAL REQUIREMENTS FOR INSURANCES

Add the following at the end of the second paragraph:

Insurances shall not contain exclusion clauses which limit cover for activities necessary for the execution of the Contract.

All insurances shall cover the entire contract period and an additional three (3) months.

Each policy of insurance effected by the Contractor for purposes of the Contract shall include a provision to the effect that the Insurer shall have a duty to give notice in writing to the Contractor and Employer of the date when a premium becomes payable not be more than thirty (30) days before that date, and the policy shall remain in force until thirty (30) days after the giving of such notice.

SECTION XI - CONTRACT FORMS

TABLE OF FORMS

FORM No. 1 - NOTIFICATION OF INTENTION TO AWARD

FORM No. 2 - NOTIFICATION OF AWARD - LETTER OF ACCEPTANCE

FORM No. 3 - CONTRACT AGREEMENT

FORM No. 4 - PERFORMANCE SECURITY [Option 1 - Unconditional Demand Bank Guarantee]

FORM No. 5 - ADVANCE PAYMENT SECURITY

FORM No. 6 - RETENTION MONEY SECURITY

FORM NO. I - NOTIFICATION OF INTENTION TO AWARD

[This Notification of Intention to Award shall be sent to each Tenderer that submitted a Tender.] [Send this Notification to the Tenderer's Authorized Representative named in the Tender Information Form]

FORMAT

For the attention of Tenderer's Authorized Representative

Name: *[insert Authorized Representative's name]* Address: *[insert Authorized Representative's Address]* Telephones: *[insert Authorized Representative's telephone/fax numbers]* Email Address: *[insert Authorized Representative's email address]*

[IMPORTANT: *insert the date that this Notification is transmitted to Tenderers. The Notification must be sent to all Tenderers simultaneously. This means on the same date and as close to the same time as possible.*]

Date of Transmission:

This Notification is sent by: *[email]* on *[date]* (local time)

Procuring Entity: *[insert the name of the Procuring entity]*

Contract title: *[insert the name of the contract]*

Country: Kenya, County _____ *(if the Procuring Entity is from a County)*

This Notification of Intention to Award (Notification) notifies you of our decision to award the above contract. The transmission of this Notification begins the Standstill Period. During the Standstill Period, you may:

- a) Request a debriefing in relation the evaluation of your Tender, and/or
- b) Submit a Procurement-related Complaint in relation to the decision to award the contract.

1. The successful Tenderer

Name: *[insert name of successful Tenderer]* Address: *[insert address of the successful Tenderer]* Contract price: *[insert contract price of the successful Tender]*

2 Other Tenderers: *insert names of all Tenderers that submitted a Tender. If the Tender's price was evaluated include the evaluated price as well as the Tender price as read out.]*

	Name of Tenderer	Tender price	Evaluated Tender price	Comments (if any)
1				
2				
3				
4				
5				
6				
7				
Etc.				

1. How to request a debriefing

DEADLINE: The deadline to request a debriefing expires at midnight on *[insert date]* (local time).

You may request a debriefing in relation to the results of the evaluation of your Tender. If you decide to request a debriefing your written request must be made within three (3) Business Days of receipt of this Notification of Intention to Award. Provide the contract name, reference number, name of the Tenderer, contact details; and address the request for debriefing as follows:

Attention: *[insert full name of person, if applicable]* **Title/position:** *[insert title/position]* **Procuring Entity:** *[insert name of Procuring Entity]* **Email address:** *[insert email address]*

If your request for a debriefing is received within the 3 Business Days deadline, we will provide the debriefing within five (5) Business Days of receipt of your request. If we are unable to provide the debriefing within this period, the Standstill Period shall be extended by five (5) Business Days after the date that the debriefing is provided. If this happens, we will notify you and confirm the date that the extended Standstill Period will end. The debriefing may be in writing, by phone, video conference call or in person. We shall promptly advise you in writing how the debriefing will take place and confirm the date and time.

If the deadline to request a debriefing has expired, you may still request a debriefing. In this case, we will provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of the Contract Award Notice.

2. How to make a complaint

Period: Procurement-related Complaint challenging the decision to award shall be submitted by midnight, *[insert date]* (local time).

Provide the contract name, reference number, name of the Tenderer, contact details; and address the Procurement-related Complaint as follows:

Attention: *[insert full name of person, if applicable]*

Title/position: *[insert title/position]*

Procuring Entity: *[insert name of Procuring Entity]*

Email address: *[insert email address]*

At this point in the procurement process, you may submit a Procurement-related Complaint challenging the decision to award the contract. You do not need to have requested, or received, a debriefing before making this complaint. Your complaint must be submitted within the Standstill Period and received by us before the Standstill Period ends.

In summary, there are four essential requirements:

- a) You must be an 'interested party'. In this case, that means a Tenderer who submitted a Tender in this tendering process, and is the recipient of a Notification of Intention to Award.
- b) The complaint can only challenge the decision to award the contract.
- c) You must submit the complaint within the period stated above.
- d) You must include, in your complaint, all of the information necessary to support your case.
- e) The application must be accompanied by the fees set out in the Procurement Regulations, which shall not be refundable (information available from the Public Procurement Authority at www.ppoa.go.ke).

3. Standstill Period

- a) **DEADLINE:** The Standstill Period is due to end at midnight on *[insert date]* (local time).
 - i) The Standstill Period lasts ten (14) Days after the date of transmission of this Notification of Intention to Award.
 - ii) The Standstill Period may be extended as stated in Section 4 above.

If you have any questions regarding this Notification please do not hesitate to contact us. On behalf of the Procuring Entity:

Name _____

Title and Position _____

Signature _____

Date _____

FORM NO. 2 - NOTIFICATION OF AWARD

Letter of Acceptance

[letter head paper of the Procuring Entity]

[date]

FORMAT

To: *[name and address of the Contractor]*

This is to notify you that your Tender dated *[date]* for execution of the *[name of the Contract and identification number, as given in the SCC]* for the Accepted Contract Amount *[amount in numbers and words]* *[name of currency]*, as corrected and modified in accordance with the Instructions to Tenderers, is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 30 days in accordance with the Conditions of Contract, using, for that purpose, one of the Performance Security Forms included in Section X, Contract Forms, of the tender document.

We attach a copy of the Contract for your

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Attachment: Contract Agreement

FORM NO. 3 – CONTRACT AGREEMENT

THIS AGREEMENT made the _____ day of _____, _____, between

_____ of _____ (hereinafter “the Procuring Entity”), of the one part, and _____

_____ of _____

(herein after “the Contractor”), of the other part:

WHEREAS the Procuring Entity desires that the Works known as _____

should be executed by the Contractor, and has accepted a Tender by the Contractor for the execution and completion of these Works and the remedying of any defects therein, The Procuring Entity and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
 - a) The Letter of Acceptance
 - b) The Letter of Tender
 - c) The addenda Nos _____ (if any)
 - d) The Particular Conditions
 - e) The General Conditions;
 - f) The Specification
 - g) The Drawings; and
 - h) The completed Schedules and any other documents forming part of the contract.
3. In consideration of the payments to be made by the Procuring Entity to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Procuring Entity to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Procuring Entity 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 hereto have caused this Agreement to be executed in accordance with the laws of Kenya on the day, month and year specified above.

Signed by _____
_____(for the Procuring Entity)

Signed by _____

(for the Contractor)

FORM NO. 4 - PERFORMANCE SECURITY

– (Unconditional Demand Bank Guarantee)

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: _____ *[insert name and Address of Procuring Entity]* **Date:** _____ *[Insert date of issue]*

PERFORMANCE GUARANTEE No.: _____

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

1. We have been informed that _____ (herein after called "the Applicant") has entered into Contract No. _____ dated _____ with the Beneficiary, for the execution of _____ (herein after called "the Contract").
2. Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.
3. At the request of the Applicant, we as Guarantor, here by irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ (),¹ such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.
4. This guarantee shall expire, no later than the Day of 2...², and any demand for payment under it must be received by us at this office indicated above on or before that date.
5. The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed *[six months]* *[one year]*, in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

[Name of Authorized Official, signature(s) and seals/stamps]

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

¹*The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency(cies) of the Contract or a freely convertible currency acceptable to the Beneficiary.*

²*Insert the date twenty-eight days after the expected completion date as described in GC Clause 11.9. The Procuring Entity should note that in the event of an extension of this date for completion of the Contract, the Procuring Entity would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Procuring Entity might consider adding the following text to the form, at the end of the pen ultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months] [one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."*

FORM NO. 6 - ADVANCE PAYMENT SECURITY

[Demand Bank Guarantee] [Guarantor letterhead or SWIFT identifier code] [Guarantor letterhead or SWIFT identifier code]

Beneficiary: _____ [Insert name and Address of Procuring Entity]
Date: _____ [Insert date of issue]

ADVANCE PAYMENT GUARANTEE No.: _____
[Insert guarantee reference number]

[Insert

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

1. We have been informed that _____ (herein after called "the Applicant") has entered into Contract No. _____ dated _____ with the Beneficiary, for the execution of _____ (herein after called "the Contract").
2. Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum _____
() is to be made against an advance payment guarantee.
3. At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____
()¹ upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:
 - a) Has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or
 - b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.
4. A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number _____ at _____
5. The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that ninety (90) percent of the Accepted Contract Amount, less provisional sums, has been certified for payment, or on the _____ day of _____, 20____, ² whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.
6. The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months] [one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.

[Name of Authorized Official, signature(s) and seals/stamps]

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

¹ The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Procuring Entity.

² Insert the expected expiration date of the Time for Completion. The Procuring Entity should note that in the

event of an extension of the time for completion of the Contract, the Procuring Entity would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Procuring Entity might consider adding the following text to the form, at the end of the penultimate paragraph: “The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months] [one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.”

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD

FORM NO. 7 - RETENTION MONEY SECURITY

[Demand Bank Guarantee]

[Guarantor letterhead]

Beneficiary: _____ [Insert name and Address of
Procuring Entity]

Date: _____ [Insert date of issue]

ADVANCE PAYMENT GUARANTEE No.: _____

[Insert guarantee reference number]

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

1. We have been informed that _____ [insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture] (herein after called" the Contractor") has entered into Contract No. _____ [insert reference number of the contract] dated with the Beneficiary, for the execution of _____ [insert name of contract and brief description of Works] (herein after called" the Contract").
2. Furthermore, we understand that, according to the conditions of the Contract, the Beneficiary retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when the Taking-Over Certificate has been issued under the Contract and the first half of the Retention Money has been certified for payment, and payment of [insert the second half of the Retention Money] is to be made against a Retention Money guarantee.
3. At the request of the Contractor, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of [insert amount in figures] ([insert amount in words _____])¹ upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.
4. A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the second half of the Retention Money as referred to above has been credited to the Contractor on its account number at _____ [insert name and address of Applicant's bank].
5. This guarantee shall expire no later than the..... Day of....., 2...², and any demand for payment under it must be received by us at the office indicated above on or before that date.
6. The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months] [one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.

[Name of Authorized Official, signature(s) and seals/stamps]

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

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD

FORM NO. 8 BENEFICIAL OWNERSHIP DISCLOSURE FORM

INSTRUCTIONS TO TENDERERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE FORM

This Beneficial Ownership Disclosure Form ("Form") is to be completed by the successful tenderer. In case of joint venture, the tenderer must submit a separate Form for each member. The beneficial ownership information to be submitted in this Form shall be current as of the date of its submission.

For the purposes of this Form, a Beneficial Owner of a Tenderer is any natural person who ultimately owns or controls the Tenderer by meeting one or more of the following conditions:

- Directly or indirectly holding 25% or more of the shares.*
- Directly or indirectly holding 25% or more of the voting rights.*
- Directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Tenderer.*

Tender Reference No.: _____ [insert identification no] Name of the Assignment: _____ [insert name of the assignment] to: _____ [insert complete name of Procuring Entity]

In response to your notification of award dated _____ [insert date of notification of award] to furnish additional information on beneficial ownership: ____ [select one option as applicable and delete the options that are not applicable]

I) We here by provide the following beneficial ownership information.

Details of beneficial ownership

Identity of Beneficial Owner	Directly or indirectly holding 25% or more of the shares (Yes / No)	Directly or indirectly holding 25 % or more of the Voting Rights (Yes / No)	Directly or indirectly having the right to appoint a majority of the board of the directors or an equivalent governing body of the Tenderer (Yes / No)
<i>[include full name (last, middle, first), nationality, country of residence]</i>			

OR

- ii) *We declare that there is no Beneficial Owner meeting one or more of the following conditions: directly or indirectly holding 25% or more of the shares. Directly or indirectly holding 25% or more of the voting rights. Directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Tenderer.*

OR

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD

We declare that we are unable to identify any Beneficial Owner meeting one or more of the following conditions. [If this option is selected, the Tenderer shall provide explanation on why it is unable to identify any Beneficial Owner]

Directly or indirectly holding 25% or more of the shares. Directly or indirectly holding 25% or more of the voting rights.

Directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Tenderer]”

Name of the Tenderer:[insert complete name of the Tenderer] _____*

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

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

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

Date signed [insert date of signing] day of..... [Insert month], [insert year]

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD

SUPERVISION CHECKLIST

Supervision Check List

Project Name: REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD	Date	Signatures
1. This check list is for Resident Engineer to check Contractor's work execution process.	The Engineer's Representative (Project Engineer)	
2. Fill in date of checking as (day/month), mark as indicated in Filling Example, and state remarks.		
3. Put this check list in the Monthly Progress Report.	Resident Engineer	

Item	Check Point	before	During execution									after	Remarks
		Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Reason for unsatisfactory performance (Site diary No.) Corrective order by authority (Date) Excellent point to be specified
		/	/	/	/	/	/	/	/	/	/	/	
1	Execution system in general	1-1	Works Execution Programme (including its revised version if any) is submitted before the date	☐	☐	☐	☐	☐	☐	☐	☐	☐	

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD

Supervision Check List

Project Name: **REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD**

Date	Signatures
------	------------

			specified in contract document										
		1-2	Works Execution Programme properly reflects the given specifications and site conditions	☐	☐	☐	☐	☐	☐	☐	☐	☐	
		1-3	Execution procedures are in accordance with Works Execution Programme		☐	☐	☐	☐	☐	☐	☐	☐	
2	Equipment holding	2-1	All equipment used are properly mobilized in accordance		☐	☐	☐	☐	☐	☐	☐	☐	

REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD

Supervision Check List

Project Name: **REHABILITATION OF AMALA RIVER – BOMET – KAPLONG (B7) ROAD**

Date	Signatures
------	------------

			with Works Execution Programme										
		2-2	All equipment used is well maintained during the execution of works		☐	☐	☐	☐	☐	☐	☐	☐	
3	Contractor's in-house staff	3-1	Qualified technical staff of Contractor are properly assigned as specified in Works Execution Programme		☐	☐	☐	☐	☐	☐	☐	☐	
		3-2	Contractor's in-house key staff understand work process		☐	☐	☐	☐	☐	☐	☐	☐	

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			and schedule properly										
		3-3	Contractor's in-house staff give technical guidance and direction to workers and operators properly and timely		☐	☐	☐	☐	☐	☐	☐	☐	
		3-4	Communications with authority in writing is properly and timely		☐	☐	☐	☐	☐	☐	☐	☐	
4	Personnel employment	4-1	Workers and operators are deployed in accordance with Works Execution Programme		☐	☐	☐	☐	☐	☐	☐	☐	

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		4-2	Wage payment is properly made on time		☐	☐	☐	☐	☐	☐	☐	☐		
5	Site base facilities	5-1	Office and stockyard are prepared in accordance with Works Execution Programme		☐	☐	☐	☐	☐	☐	☐	☐		
		5-2	Site is well maintained during the work execution and cleared on completion		☐	☐	☐	☐	☐	☐	☐	☐		
		5-3	Material stored on site is properly		☐	☐	☐	☐	☐	☐	☐	☐		

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			managed during the work execution										
6	Quality and quantity management	6-1	Material testing, structural examination, and measurements are properly and PERIODICLY conducted based on specifications and Works Execution Programme		☐	☐	☐	☐	☐	☐	☐	☐	
		6-2	Results of material testing, structural examination and measurement		☐	☐	☐	☐	☐	☐	☐	☐	

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			ts are within the specifications.										
		6-3	Results of material testing, structural examination, and measurements are properly compiled as reports for confirmation		☐	☐	☐	☐	☐	☐	☐	☐	
7	Work scheduling	7-1	Understanding of critical path and its reflection on scheduling is proper		☐	☐	☐	☐	☐	☐	☐	☐	
		7-2	Actual proceedings are		☐	☐	☐	☐	☐	☐	☐	☐	

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			periodically compared to the planned schedule described in Works Execution Programme									
		7-3	Changes caused by site conditions are properly handled to keep things on schedule		☐	☐	☐	☐	☐	☐	☐	
		7-4	All works are completed within the contract term or within the extended term as allowed									☐

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8	Work safety management	8-1	No accident occurs to workers, operators, or third-parties.		☐	☐	☐	☐	☐	☐	☐	☐			
		8-2	Safety of workers and operators is considered		☐	☐	☐	☐	☐	☐	☐	☐	☐		
		8-3	Accident prevention efforts for third-parties are proper		☐	☐	☐	☐	☐	☐	☐	☐	☐		
		8-4	Traffic and site safety devices are properly installed and managed		☐	☐	☐	☐	☐	☐	☐	☐	☐		
		8-5	Temporary facilities (e.g. scaffolding)		☐	☐	☐	☐	☐	☐	☐	☐	☐		

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			are constantly checked										
9	Environmental and social management	9-1	Environmental and social mitigation efforts (e.g. against noise, vibration, emission, and dust) are conducted		☐	☐	☐	☐	☐	☐	☐	☐	
		9-2	Waste material from site is properly disposed		☐	☐	☐	☐	☐	☐	☐	☐	
		9-3	Damage to existing roads, works and services is avoided or are repaired		☐	☐	☐	☐	☐	☐	☐	☐	

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			when it occurs										
		9-4	No overloading for work-related vehicles is reported	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Filling Example: ✓ Check point is satisfactory ■ Check point is unsatisfactory N/A Not applicable

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