REPUBLIC OF KENYA

KENYA URBAN ROADS AUTHORITY
Transforming Urban Mobility

BIDDING DOCUMENT – VOLUME 1A

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TENDER NAME: EPC CONTRACT FOR DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI AND CAPACITY IMPROVEMENT OF MUTHAIGA PANGANI UNDERPASS

TENDER No.: KURA/DEV/HQ/252/2025-2026

DECEMBER, 2025

DIRECTOR (URD) KENYA URBAN ROADS AUTHORITY P.O. Box 41727 - 00100 NAIROBI. TEL:+254717105233 DirectorURD@kura.go.ke	DIRECTOR GENERAL KENYA URBAN ROADS AUTHORITY P.O. Box 41727 - 00100 NAIROBI. TEL:+254717105233 dg@kura.go.ke

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KENYA URBAN ROADS AUTHORITY
Efficient and safe urban roads
Barabara Plaza, Mazao Road - Off South Airport Road, JKIA
Tel: 254-020-8013844 / 254-717-105233
Email: info@kura.go.ke Web: www.kura.go.ke
P.O. Box 41727-00100, GPO, NAIROBI

TENDER DOCUMENTS FOR EPC CONTRACT FOR DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI AND CAPACITY IMPROVEMENT OF MUTHAIGA PANGANI UNDERPASS

TENDER No.: KURA/DEV/HQ/252/2025-2026

NAME AND CONTACT ADDRESSES OF PROCURING ENTITY

Name: KENYA URBAN ROADS AUTHORITY (KURA)

Address: P.O. BOX 41727-00100, NAIROBI

Email address: info@kura.go.ke

(2) Invitation to Tender (ITT) No.: KURA/DEV/HQ/252/2025-2026

(3) Tender Name: EPC CONTRACT FOR DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI AND CAPACITY IMPROVEMENT OF MUTHAIGA PANGANI UNDERPASS

INVITATION TO TENDER

PROCURING ENTITY: KENYA URBAN ROADS AUTHORITY (KURA)

CONTRACT NAME AND DESCRIPTION: EPC CONTRACT FOR DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI AND CAPACITY IMPROVEMENT OF MUTHAIGA PANGANI UNDERPASS
TENDER NO: KURA/DEV/HQ/252/2025-2026.

INVITATION TO BID.

1) The Government of the Republic of Kenya has received commitment from the People's Republic of China through the China Export Import (EXIM) Bank to finance the cost of the Capacity Enhancement of Pangani - Muthaiga - Kiambu - Ndumberi (B32) Road. The financing agreement shall be signed upon finalization of the commercial contract.

2) Kenya Urban Roads Authority, a State Corporation under the Ministry of Roads and Transport in the State Department for Roads, established under the Kenya Roads Act 2007, now seeks to invite Four (4) locally established Chinese Enterprises as approved under use of specially Permitted Procurement Method in accordance with the letter of intentional support set by the People's Republic of China through the China EXIM Bank for the proposed Capacity Enhancement of Pangani - Muthaiga - Kiambu - Ndumberi (B32) road project and Adjacent Road Network to submit their Bid Documents in order to be considered for the execution of these works.

3) The Capacity Enhancement of Pangani - Muthaiga -Kiambu - Ndumberi (B32) Road and adjacent road network will improve traffic flow along the Eastern part of Nairobi Metropolis as it seeks to decongest traffic along both Kiambu Road and Thika Superhighway. The Project will also improve the level of service and reduce travel times, improve road safety and increase accessibility thereby spurring economic growth of both Nairobi and Kiambu Counties with ripple effect to the overall Kenyan Economy.

4) The Project will be implemented through FIDIC Silver Book – Engineering Procurement and Construction Contract Agreements and will involve the following:
    i) Upgrading of the entire project road from a two- lane single carriageway to a four - lane dual carriageway including 2 lane service lanes on either side and pedestrian walkways along the entire project road section.
    ii) Capacity enhancement of Muthaiga- Pangani section by improving the capacity of the Pangani underpass.
    iii) Construction of Interchanges/ underpasses/overpasses at the following locations: Tala Road Junction, Ridgeways, Northern bypass intersection, Thindigua, Mashroom, KIST/Muthithi road junction, Kirigiti Road Junction. The minimum improvement is as indicated in the provided drawings.
    iv) Provision of Footbridges at various locations along the road.
    v) Enhancement of Key roads in the network abutting the project road as follow:

1. Main Project Road
    - Main Trunk Road
        - Muthaiga-Kirigiti Junction
        - Kirigiti JN- Kiambu Town- Governor's Office
        - Governor's office- Ndumberi-Sasini
    - Bypasses
        - Kiambu Eastern Bypass
        - Kiambu Western Bypass
        - Kiambu Southern Bypass

- Improvement of identified adjoining access and spur roads

2. Maintenance of the existing roads during construction period.

3. Management and control of traffic during construction period.

4. The construction period will be 36 months and defects Notification period will be 12 months.

5) You are required to complete the Bid Documents and demonstrate you are qualified to perform the services (technical capabilities, financial capabilities, description of similar assignments, experience in similar assignments/conditions, availability of appropriate skills among staff etc.)To be considered for Award, Applicants must demonstrate that they have achieved a minimum annual construction turnover of Kenya Shillings 65 Billion or USD 500 Million for the last 5 years calculated as the sum of total certified annual payments received for contracts in progress and/or completed divided by the number of years. A firm may apply as both individually, and as part of a JV to enhance their bid.

6) The Executing Agency is under no Obligation to Award any firm or joint venture who submits a Bid. Should the Tender be cancelled, tenderers are not entitled to any compensation, nor will any reason be given for the cancellation.

7) KURA wishes to invite your firm to collect bid documents for the above tender and submit your bid as per the tender requirement to be received on or before 21st January, 2026 latest by 1100Hrs East African Time.

8) A complete set of tender documents may be purchased or obtained by interested tenderers upon payment of a non- refundable fee of Kshs. 5,000 (Kenya Shillings Five Thousand Only) in cash or Banker's Cheque and payable to the KENYA URBAN ROADS AUTHORITY.

9) You may obtain further information at the address and email given below during office hours (weekdays from 0800 to 1700 EAT, excluding public holidays):

Director, Road Development
Kenya Urban Roads Authority
Barabara Plaza, Off Airport South Road, Mazao Road, Block D
P.O. Box 41727-00100, Nairobi
Email: supplychain@kura.go.ke

The Tender shall be clearly marked with the following: Tender for:
Capacity Enhancement of Pangani – Muthaiga - Kiambu - Ndumbaru (B32) Road Project and Adjacent Road Network.

Tender No. KURA/DEV/HQ/252/2025-2026 and must be delivered to the address below **on or before 21st January, 2026 at 1100Hrs East African Time.**

Kenya Urban Roads Authority
SUPPLY CHAIN MANAGEMENT Department
GROUND FLOOR; BLOCK D
BARABARA PLAZA OFF AIRPORT SOUTH ROAD MAZAO ROAD,
P.O. BOX 41727-00100, NAIROBI

10) A Mandatory Pre-Tender Site Visit will be held on 7th January 2026 at 11:30am. Bidders are Requrired to Converge at Muthaiga junction (Kiambu road/Thika Road Junction)

NOTE:

Every Bidder shall be represented by one Technical Person with a Minimum qualification of a Diploma in Civil/Highway Engineering. The Individual MUST Bring along the following:

1. Original ID/Passport and a CERTIFIED Copy

2. CERTIFIED copy of Diploma/Higher Diploma/Degree Certificate

3. CERTIFIED Copy of Registration Certificate and proof of current subscription by Engineers Board of Kenya (EBK)/ Kenya Engineering Technology Registration Board (KETRB)/ Institute of Engineering Technologists and Technicians (IET)

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-bid 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.

The tender closing date will be on **21st January, 2026** at **1100Hrs East African Time**. Tenders will be opened immediately thereafter in the presence of Applicants/ Representatives who wish to attend at KURA Block Ground Floor, Board Room.

Any further tender addendums or clarifications that may arise before the submission date will be communicated through the **Email:** supplychain@kura.go.ke

Deputy Director, Supply Chain Management
For: DIRECTOR GENERAL.

1) Physical address for the location (City, Street Name, Building, Floor Number and Room)

SUPPLY CHAIN MANAGEMENT OFFICE, BARABARA PLAZA OFF AIRPORT SOUTH ROAD MAZAO ROAD, GROUND FLOOR, BLOCK D

Name: ENG. SILAS M. KINOTI

Designation: DIRECTOR GENERAL

DIRECTOR GENERAL
KENYA URBAN ROADS AUTHORITY (KURA)
P. O. Box 41727 - 00100
NAIROBI

Signature 

Date: 30th December 2025

PART 1 - TENDERING PROCEDURES

SECTION I-INSTRUCTIONS TO TENDERERS

A GENERAL PROVISIONS

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.**

1. Fraud and Corruption

1.1 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.

1.2 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.

1.3 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.

1.4 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.

2. Eligible Tenderers

2.1 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.**

2.2 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.

2.3 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 elationship 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.

2.4 A tenderer shall not be involved incorrupt, coercive, obstructive or fraudulent practice. A tenderer that is proven to have been involved in any of these practices shall be automatically disqualified.

2.5 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.

2.6 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 inconformity 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.

2.7 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.

2.8 A Tenderer that is a state-owned enterprise or a public institution owned or controlled by Government of 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.

2.9 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.

2.10 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.

2.11 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. Eligible Goods, Equipment, and Services

3.1 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.

3.2 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.

4. Tenderer's Responsibilities

4.1 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.

4.2 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.

4.3 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.

4.4 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

5. Sections of Tender Document

5.1 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

PART3: Conditions of Contract and Contract Forms

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

5.2 The Invitation to bid issued by the Procuring Entity is not part of the Contract documents.

5.3 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.

5.4 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.

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

6.1 ATenderer 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 p**rior 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.

6.2 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 benecessary for preparing a tender. The costs of visiting the Site shall be at theTenderer'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.

6.3 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.

6.4 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.

6.5 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.

7. Amendment of Tender Documents

7.1 At any time prior to the deadline for submission of Tenders, the Procuring Entity may amend the Tender Documents by issuing addenda.

7.2 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.

7.3 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

8. 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.

9. 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.

10. Documents Comprising the Tender

10.1 The Tender shall comprise the following:

a) Form of Tender prepared in accordance with ITT 12;
b) Schedules including priced Bill of Quantities, completed inaccordance 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.

10.2 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.

11. Form of Tender and Schedules

11.1 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.

11.2 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.

12. Alternative Tenders

12.1 Unless otherwise specified in the TDS, alternative Tenders shall not be considered.

12.2 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.

12.3 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, technicalspecifications, 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.

12.4 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.

13. Tender Prices and Discounts

13.1 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.

13.2 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.

13.3 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.

13.4 The Tenderer shall quote any discounts and the methodology for their application in the Form of Tender, in accordance with ITT 12

13.5 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, except in 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.

13.6 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. Currencies of Tender and Payment

14.1 The currency (ies) of the Tender shall be in USD and the currency (ies) of payments shall be as stipulated in the Loan Agreement between Government of Kenya and the Financier.

15. 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.

16. Documents Establishing the Eligibility and Qualifications of the Tenderer

16.1 Tenderers shall complete the Form of Tender, included in Section IV, Tender Forms, to establish Tenderer's eligibility in accordance with ITT 4.

16.2 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.

16.3 If a margin of preference applies as specified in accordance with ITT33. 1, national tenderers, individually or in joint ventures, applying for eligibility fornational preference shall supply all information required to satisfy the criteria for eligibility specified in accordance with ITT 33.1.

16.4 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 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, orapossibility of collusion between tenderers, and there by help to prevent any corrupt influence in relation to the procurement process or contract management.

16.5 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.

16.6 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.

16.7 All information provided by the tenderer pursuant to these requirements must be complete, current and accurateas at the date of provision to the Procuring Entity. In submitting the information required pursuant to these requirements, theTenderer shall warrant that the information submitted is complete, current and accurate as at the date of submission to the Procuring Entity.

16.8 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.

16.9 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.

16.10 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.

17. Period of Validity of Tenders

17.1. 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.

17.2 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.

18. Tender Security

18.1 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.

18.2 If a Tender Security is specified pursuant to ITT19.1, the Tender Security shall be a demand guarantee in any of the following forms at the Tenderer's option:

i) a bank guarantee;

ii) a guarantee issued by a financial institution approved and licensed by the Central Bank of Kenya, from a reputable source, and an eligible country.

18.3 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.

18.4 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.

18.5 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.

18.6 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.

18.7 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.

18.8 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.

18.9 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.

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

19. Format and Signing of Tender

19.1 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." Inaddition, 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.

19.2 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.

19.3 The original and all copies of the Tender shall be typed or written in indelible ink and shall besigned 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.

19.4 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.

19.5 Any inter-lineation, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing theTender.

D. SUBMISSION AND OPENING OF TENDERS

20. Sealing and Marking of Tenders

20.1 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 describedinITT11; 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.

20.2 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.

21. Deadline for Submission of Tenders

21.1 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**.

21.2 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.

22. Late Tenders

The Procuring Entity shall not considerany 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.

23. Withdrawal, Substitution, and Modification of Tenders

23.1 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 theTender 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.

23.2 Tenders requested to be withdrawn in accordance with ITT 24.1 shall be returned unopened to the Tenderers.

23.3 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.

24. Tender Opening

24.1 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.**

24.2 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 attender opening.

24.3 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.

24.4 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.

24.5 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.

24.6 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 initialed by the members of the tender opening committee attending the opening.

24.7 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).

24.8 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.

24.9 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

25. Confidentiality

25.1 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.

25.2 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.

25.3 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.

26. Clarification of Tenders

26.1 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.

26.2 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.

27. Deviations, Reservations, and Omissions

27.1 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.

28. Determination of Responsiveness

28.1 The Procuring Entity's determination of a Tender's responsiveness is to be based on the contents of

thetender itself, as defined in ITT 11.

28.2 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.

28.3 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.

28.4 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.

29. Non-material Non-conformities

29.1 Provided that a tender is substantially responsive, the Procuring Entity may waive any non-conformities in the tender.

29.2 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 documentationon 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.

29.3 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.**

30. Arithmetical Errors

30.1 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.

30.2 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

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

31. 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**.

32. Margin of Preference and Reservations

32.1 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.

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

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

32.4 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.

33. Nominated Subcontractors

33.1 **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. Incase 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.

33.2 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.

33.3 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.

34. Evaluation of Tenders

34.1 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.

34.2 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.

34.3 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.

34.4 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 required to prepare the Eligibility and Qualification Criteria Form for each Lot.

35. 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.

36. Abnormally Low Tenders and Abnormally High

Tenders Abnormally Low Tenders

36.1 An Abnormally Low Tender is one where the Tender price, in combination with other elements of theTender, 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.

36.2 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 theTender document.

36.3 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

36.4 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.

36.5 Incase 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.

36.6 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.

37. Unbalanced and/or Front-Loaded Tenders

37.1 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.

37.2 After the evaluation of the information and detailed price analyses presented by the Tenderer, the Procuring Entitymayasappropriate:

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,

38. Qualifications of the Tenderer

38.1 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.

38.2 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 theTender document), or any other firm(s) different from theTenderer.

38.3 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.

39. 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 theTender document; and
b) The lowest evaluated price.

40. 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. Incase of annulment, all Tenders submitted and specifically, Tender securities, shall be promptly returned to the Tenderers.

F. AWARD OF CONTRACT

41. Award Criteria

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

42. 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;

43. Stand still Period

43.1 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.

43.2 Where a Standstill Period applies, it shall commence when the Procuring Entity has transmitted to eachTenderer the Notification of Intention to Enter into a Contract with the successful Tenderer.

44. Debriefing by the Procuring Entity

44.1 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 concerns regarding their tender. The Procuring Entity shall provide the debriefing within five days of receipt of the request.

44.2 Debriefings of unsuccessful Tenderers may be done in writing or verbally. The Tenderer shall bear its own costs of attending such a debriefing meeting.

45. Letter of Award

Prior to the expiry of the Tender Validity Period and upon expiry of the Standstill Period specifiedin 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.

46. Signing of Contract

46.1 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.

46.2 Within fourteen (14) days of receipt of the Contract Agreement, the successful Tenderer shall sign, date, and return it to the Procuring Entity.

46.3 The written contract shall be entered into within the period specified in the notification of award and before expiry of the tender validity period.

47. Performance Security

47.1 The Contractor shall provide performance security for his proper performance of the Contract to the Employer within 28 days after both the following conditions are fulfilled namely;

(i) signing of the Contract Agreement;

(ii)signing of the Individual Loan Facility Agreement between the National Treasury of Kenya and the financial institution(s) of China.

48. 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 containthe 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.

49. Procurement Related Complaint

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

Section II – Tender Data Sheet (TDS)

The following specific data shall compliment, 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	
ITT 1.1	The name of the contract is **EPC CONTRACT FOR DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI AND CAPACITY IMPROVEMENT OF MUTHAIGA PANGANI UNDERPASS**. The reference number of the contract is **KURA/DEV/HQ/252/2025-2026** The number and identification of lots (contracts) comprising this tender are NOT APPLICABLE
ITT 2.3	The information made available on competing firms is as follows: NOT APPLICABLE
ITT 2.4	The firms that provided consulting services for the contract being tendered for are: NOT APPLICABLE
ITT 3.1	Maximum number of members in the Joint Venture(JV) shall be: **NOT APPLICABLE**
ITT 3.12	Registration with the National Construction Authority (NCA) in Category 1 or equivalently certified in the country of origin is a requirement for the tender. Bidders to provide certified copies of the NCA certificate or equivalently certified in the country of origin.
ITT 3.14	Only a valid Tax Compliance Certificate verifiable via the Kenya Revenue Authority shall be accepted and is a condition for tender.
B. Contents of Tender Document	
ITT7.1	(i) The Tenderer will submit any request for clarification in writing at the address: SUPPLY CHAIN MANAGEMENT BARABARA PLAZA OFF AIRPORT SOUTH ROAD MAZAO ROAD, GROUND FLOOR, BLOCK D P.O. BOX 41727-00100, NAIROBI supplychain@kura.go.ke To reach the Procuring Entity not later than: To be Decided Any further tender addendums or clarifications that may arise before the submission date will be communicated through the **Email:** supplychain@kura.go.ke
ITT7.2	(A) Pre-Tender conference ***SHALL NOT*** take place (B) A pre-arranged pretender visit of the site of the works ***SHALL*** take place. SUPPLY CHAIN MANAGEMENT OFFICE BARABARA PLAZA OFF AIRPORT SOUTH ROAD MAZAO ROAD, GROUND FLOOR, BLOCK D
ITT7.3	**i.** The Tenderer will submit any questions in writing, to reach the

	Procuring Entity not later than **7days before closure/opening date.** will be communicated through the **Email:** supplychain@kura.go.ke
ITT7.4	The Procuring Entity's website where Minutes of the pre-Tender meeting and the pre-arranged pretender site visit will be published **NOT APPLICABLE**
ITT7.5	For Clarification of Tender purposes, for obtaining further information and for purchasing tender documents, the Procuring Entity's address is: KENYA URBAN ROADS AUTHORITY SUPPLY CHAIN MANAGEMENT OFFICE BARABARA PLAZA OFF AIRPORT SOUTH ROAD MAZAO ROAD, GROUND FLOOR; BLOCK D P.O. BOX 41727-00100, NAIROBI DEPUTY DIRECTOR (SUPPLY CHAIN MANAGEMENT), +056717105233, supplychain@kura.go.ke
19.2 (h)	The acceptable BID SECURITY IS IN THE FORM OF UNCONDITIONAL BANK GUARANTEE ISSUED BY BANKS REGULATED BY THE CENTRAL BANK OF KENYA of **KSHS. 5,000,000 (KENYA SHILLINGS FIVE MILLION ONLY)**
C. Preparation of Tenders	
ITT 11.1 (h)	The Tenderer shall submit the following additional documents in its Tender: ***As indicated in the qualification criteria and Tender Notice*** The Tenderer shall submit the following additional documents in its Tender: 1. Written Form of Power Attorney, signed by Commissioner for Oaths 2. Appendix to form of tender fully filled, stamped and signed 3. A schedule of basic rates for construction materials fully filled, stamped and signed 4. Schedule of completed and ongoing works 5. Certified certificate of incorporation 6. certified copy of recent CR12 form generated through the system-(12months before opening date) from Registrar of companies or equivalent from the country of origin 7. Copy of registration certificate with National Construction Authority in the stated category or equivalent from the country of origin 8. Copies of audited accounts for the last five years **ALL CERITIFICATION MUST BE BY COMMISSIONER FOR OATHS.**
ITT 13.1	The Tenderer shall chronologically and sequentially serialize all pages of the tender documents submitted in the format of 1,2,3,4,5……. Including the cover page and all other pages.
ITT 13.2	Alternative Tenders SHALL NOT BE considered.
ITT 13.3	Alternative times for completion SHALL NOT BE permitted.
ITT 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: NOT APPLICABLE
ITT 15.2	Foreign currency requirements as per loan agreement
ITT 18.1	The Tender validity period shall be 210DAYS
ITT 19.1	A Tender Security amounting to Kshs. 5,000,000 (Kenya Shillings Five Million Only) SHALL BE required.
ITT 19.5	Other documents required are: NOT APPLICABLE
ITT 19.8	Add after "Where" the words "tender security or" The Procuring Entity will declare the Tenderer ineligible to be awarded contracts by the Procuring Entity for a period of 3 Financial years.
ITT 20.1	The tenderer shall prepare and submit **ONE** original Tender document and **ONE** Copy Tender Document.
20.02	The written confirmation of authorization to sign on behalf of the

	Tenderer shall consist of *Certificate of Independent Tender Determination*
D. Submission and Opening of Tenders	
ITT 21.3	A tender package or container that cannot fit in the tender box shall be received as follows: Bulky tenders which will not fit in the tender box shall be received and registered in the Bulk Tender Register at the supply chain management office.
ITT 22.1	For tender submission purposes only, the Procuring Entity address is: 1. Name of Procuring Entity: KENYA URBAN ROADS AUTHORITY (KURA) 2. Postal Address Attn: ENG. SILAS M. KINOTI DIRECTOR GENERAL P.O. BOX 41727-00100, NAIROBI 3. Physical address for the hand courier delivery to an office or tender box SUPPLY CHAIN MANAGEMENT BARABARA PLAZA OFF AIRPORT SOUTH ROAD MAZAO ROAD, GROUND FLOOR, BLOCK D 4. Date and Time for submission of tenders **(As per the Invitation to bid).** 5. Tenderers SHALL NOT submit tenders electronically.
ITT 25.1	If Tenderers are allowed to submit tenders electronically, they shall follow the electronic tender submission procedures specified below: NOT APPLICABLE
ITT 25.6	The tenders shall be initialed by representatives of the Procuring Entity attending Tender opening. Initialization shall be conducted as follows: - ALL MEMBERS OF TENDER OPENING COMMITTEE SHALL • Initialize summary page of BOQ, • Form of Tender • Bid Bonds/Tender Securing Declaration Form • Cover page of the Bid Document • Last page of the Bid Document
E. Evaluation and Comparison of Tenders	
ITT 31.2	The arithmetic error(s) shall be considered a major deviation that leads to disqualification.
ITT 33.2	A margin of preference SHALL NOT apply.
ITT 33.4	The invitation to tender is extended to the following groups that qualify for Reservations NOT APPLICABLE
ITT 34.1	At this time the Procuring Entity, DOES NOT INTEND to execute certain specific parts of the works by subcontractors selected in advance.
ITT 34.2	Contractors may propose subcontracting maximum percentage of subcontracting permitted is 49% of the total contract amount. 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 designed as follows: NOT APPLICABLE
ITT 35.2 (d)	Additional requirements apply. These are detailed in the evaluation criteria in Section III-Evaluation and Qualification Criteria
ITT 48.2	Additional requirements are: NOT APPLICABLE

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: ENG. SILAS M. KINOTI, MBS Title/position: DIRECTOR GENERAL Procuring Entity: KENYA URBAN ROADS AUTHORITY E-mail address: dg@kura.go.ke 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 III- 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.

PRE- QUALIFICATION CHECKLIST FOR COMPLETENESS AND RESPONSIVENESS

S/No.	Completeness and Responsiveness Criteria	References	Requirement
1.	Form of Tender	Section IV; ITT 11.1	- Tenderer must fill the Form of Tender on stationery with its letterhead clearly showing the Tenderer's complete name and business address. -Amount must be indicated - Properly fill, sign and stamp
2.	Appendix to form of tender	Form 8	Must fill, stamp and sign

3.	Shedule of basic rates for construction materials	Form 7	Must fill, stamp and sign
4.	Tenderers Eligibility Confidential Business Questionnaire	Section IV; ITT 6.4	- Properly fill, sign and Stamp - Provide all required information - certified copy of recent CR12 form generated through the system- (12months before opening date) from Registrar of companies
5.	Certificate of Independent tender determination	Section IV; ITT 2.2	- Properly fill, sign and Stamp - Provide all required information
6.	Self-Declaration Form (SD1, 2)	Section IV;	- Properly fill, sign and Stamp - Provide all required information in the two forms
7.	Declaration and Commitment to Code of Ethics	Section IV;	- Properly fill, sign and Stamp - Provide all required information
8.	Appendix I: Fraud and Corruption	Section IV	Read, understand and comply.
9.	Priced Bill of Quantities	Section V (Bill of Quantities)	- Fill all the bill of Quantities, sign stamp and counter sign any alteration(s)
10.	Projected Cash Flow	Section IV, Schedule A	- Properly fill, sign and Stamp
11.	Site Organization	Section IV, Schedule B	Provide all required information
12.	Contractors Equipment Form	Section IV, Schedule D	- Fully fill all the required information, Sign and Stamp
13.	Key Personnel Schedule (Form personnel I)	Section IV, Schedule F	- Provide all required information Fill all the required information in the format provided in schedule F, sign and stamp. - Declaration form to be filled,
14.	Key Personnel Schedule (Form personnel II)	Section IV, Schedule F	- Provide all required information Fill all the required information, sign and stamp
15.	Tenderers Qualification Form	Section IV, Form ELI – 1.1	- Form to be fully filled, signed and stamped as instructed.
16.	Non Performed Contracts	Section IV, Form CON 1	- Fully filled, stamped and signed -Provide all the information

17.	Financial situation and performance	-Section IV, Form FIN-3.1(1,2 &3) -Section IV, Form FIN- -3.2 Section IV, Form FIN- 3.4	-Fully filled as required, stamped and signed -Provide all the required information
18.	General Construction Experience	-Section IV, Form EXP-4.1 -Section IV, Form EXP-4.2(a),(b)	-Fully filled as required, stamped and signed -Provide all the required Information
19.	Form of Tender Security (Tender Bond)/Tender declaration Form	-Section IV, Form of Tender bond/tender declaration form	- Form of Tender Security (Tender Bond) - In the format provided with all conditions. Must be valid for 30 days after bid validity
20.	Pending Litigation	FORM CON-2	- - Fill the form provided, stamp and sign
21.	Litigation History	FORM CON-2	- Fill the form provided, stamp and sign
22.	Certificate of Tenderers Visit to Site	ITT 8.1	- There shall be a **MANDATORY site visit will be held on 7th January 2026 at 11:30am** Tenderers are required to fill sign and stamp the Site Visit Certificate in FORM CON -3 (B)
23.	Serializing of Document	ITT No. 6	- Serialize chronologically and sequentially serialize all pages of the tender documents submitted in the format of 1, 2,3,4,5……. Including the cover page and all other pages
24	Current commitments	Form FIN-3.4	- Fill the form provided, stamp and sign
25	Completed projects in the last fifteen years	Form EXP-4.2 (a)and form EXP-4.2(b)	- Fill the form provided, stamp and sign
26	Registration with National Construction Authority	ITT3.12	- As per category in the Tender Notice - Copy of certificate of registration certified by commissioner for Oaths

27	Tax compliance certificate	ITT.3.14	- Valid	
28	Certificate of incorporation	ITT 11.1(h)	- Copy of certificate of incorporation certified by Commissioner for Oaths	
29	Form of Power of Attorney	ITT 11.1(h)	- Properly filled and sign - Provide copies of national identification card or passport certified by Commissioner for Oaths	
30	Completeness of tender document	Tender Notice. ITT 12.1 & 20.3	- Bid document shall be properly bound - The original tender document shall not be rearranged - All attachments by the tenderer should be placed after the last page of the original tender documents. - The person or persons signing the bid shall initial all pages of the bid where entries have been made. - All pages with entries (Typed or hand written) must be initialed. - Any alterations made in the tender document must be countersigned.	
31	Audited accounts	ITT11.1(h)	- Provide copies of audited accounts for the last 5 years	
32	Addendum	ITT 8	Bidder must include all addenda in the bid document (if applicable	

3. **Tender Evaluation (ITT 35)**

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

i) **Alternative Completion Times,** if permitted under ITT 13.2, will be evaluated as follows: … NOT APPLICABLE …

ii) **Alternative Technical Solutions** for specified parts of the Works, if permitted under ITT 13.4, will be evaluated as follows :…… NOT APPLICABLE ……

iii) **Other Criteria; i**f permitted under ITT 35.2(d) :…… NOT APPLICABLE .....

4. Multiple Contracts (NOT APPLICABLE)

5. Alternative Tenders (ITT 13.1)

An alternative if permitted under ITT 13.1, will be evaluated as follows: NOT APPLICABLE

6. MARGIN OF PREFERENCE

A margin of preference *will be evaluated as follows:* NOT APPLICABLE

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) Incase 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 2.5 billion or USD 20 MILLION

ii) Minimum average annual construction turnover of Kenya Shillings 65 Billion or USD 500 MILLION equivalent calculated as total certified payments received for contracts in progress and/or completed within the last 5 years

iii) Experience in at least 2 contracts under road construction contracts in the role of Prime Contractor, JV member, sub-contractor, or management contractor in the last fifteen (15) years. Each contract shall have minimum contract amount of 80 million USD..

iv) Specific experience of the Contractor in contracts executed in the past fifteen (15) years., relevant to the Assignment with contractor demonstrating they have undertaken the following key activities:

(a) Earthworks (cut or fill) total:
more than 1,000,000 m^3

(b) Asphalt concrete mixed and placed total:
more than 20,000m^3
(c) Concrete (reinforced, prestressed, etc.) total:
more than 100,000m^3
(d) Improved Gravel or Graded crushed stone for base or subbase total:
More than 50,000 m^3

v) Contractor's Representative and Key Personnel, which are specified as below:-

DESIGNATION	MINIMUM REQUIREMENT	No. Required

1. Project manager	Qualification: Degree in Civil Engineering or Equivalent Be Registered Eng. by EBK as a professional engineer or equivalently certified in the country of origin. General Experience: 15 years Specific Experience in similar works: 7 years Must have handled at least 2 assignments of similar magnitude.	1
2. Deputy project manager	Qualification: Degree in Civil Engineering Be Registered by EBK as a graduate engineer or equivalently certified in the country of origin. General Experience: 12 years Must have handled at least 2 assignments of similar magnitude.	1
3. Chief design engineer	Qualification: Degree in Civil Engineering or Equivalent Be Registered Eng. by EBK as a professional engineer or equivalently certified in the country of origin. General Experience: 12 years Specific Experience in similar works: 5 years Must have handled at least 1 assignment of similar magnitude.	1
4. Bridge/ structural engineer	Qualification: Degree in Civil Engineering or Equivalent Be Registered Eng. by EBK as a professional engineer or equivalently certified in the country of origin. General Experience: 12 years Specific Experience in similar works: 5 years Must have handled at least 1 assignment of similar magnitude.	1
5.Material/pavement engineer	Qualification: Degree in Civil Engineering or Equivalent Be Registered Eng. by EBK as a professional engineer or equivalently certified in the country of origin. General Experience: 10 years Specific Experience in similar works: 5 years Must have handled at least 1 assignment of similar magnitude.	1
Project surveyor	Qualification: Degree in surveyin or Equivalent Be Registered by the relevant professional body locally or equivalently certified in the country of origin. General Experience: 10 years Specific Experience in similar works: 8 years	1

	Must have handled at least 2 assignments of similar magnitude.	
Highway design engineer	Qualification: Degree in Civil Engineering or Equivalent Be Registered Eng. by EBK as a professional engineer or equivalently certified in the country of origin. General Experience: 10 years Specific Experience in similar works: 5 years Must have handled at least 1 assignment of similar magnitude.	1
Safety and environmental expert	Qualification: Degree in safety and environment or Equivalent Be Registered by NEMA as a lead expert or equivalently certified in the country of origin. General Experience: 10 years Specific Experience in similar works: 8 years Must have handled at least 2 assignments of similar magnitude.	1

vi) Contractors key equipment listed on the table "Contractor's Equipment" below and more specifically listed as tabulated below.

No.	Equipment Type and Characteristics	Minimum Number required
1	Bulldozer Cat D8 or Equivalent	10
2	Grader Cat 14h or Equivalent	10
3	Asphalt Plant 150t/Hr	1
4	Asphalt Paver/Finisher Capable of Laying Pavement Layers to Full Width of Construction	4
5	Roller Self Propelled 20t Pneumatic 15t Smooth Drum Vibratory 20t Sheepsfoot	 4 10 10
6	Hydraulic Excavator CAT 322 or Equivalent with Rock Hammer	10
7	Wheel Loader 4WD Articulated CAT 950 or Equivalent	10
8	Low Loader 30t Capacity	5
9	Tip Truck 15t Gross Capacity	50
10	Water Tanker 9000l Capacity	10
11	Pressure Bitumen Distributor Min 5000l	3
12	Chip Spreader Self Propelled	2
13	Crusher And Associated Power Screens 150t/Hr	1
14	Mobile Concrete Mixer 6m3 Capacity Minimum	10
15	Mobile Crane 50t Capacity	2
16	Pile boring rig	1

Bidder to provide specific logbooks or lease agreements for the plants and equipments for this tender.

a) 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 five **(5) years**. The required information shall be furnished in the appropriate form.

b) 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.

c) Litigation History
There shall be no consistent history of court/arbitral award decisions against the Tenderer, in the last **Five (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.

d) Current commitments

The total value of outstanding works on the on-going contracts must not exceed the average annual turnover for the last five years.

8. QUALIFICATION FORM SUMMARY

1	2	3	*4*	*5*
Item No.	**Qualification Subject**	**Qualification Requirement**	*Document To be Completed by Tenderer*	*For Procuring Entity's Use (Qualification met or Not Met)*
1	Nationality	Nationality in accordance with ITT 4.5	Forms ELI – 1.1 with attachments	
2	Conflict of Interest	No conflicts of interest in accordance with ITT 4.3	Confidential Business Questionnaire	
3	Tax Obligations for Kenyan Tenderers in the joint venture	Has produced a current tax clearance certificate or tax exemption certificate issued by the Kenya Revenue Authority in accordance with ITT 4.15.	ITT 11.1(h)	
4	PPRA Eligibility	Not having been declared ineligible by the PPRA as described in ITT 4.6	ITT 13.1 (h)	
5	State- owned Enterprise owned or controlled by Government of Kenya	Meets conditions of ITT 3.7	Forms ELI – 1.1 with attachments	
6	Goods, equipment and services to be supplied under the contract	To have their origin in any country that is not determined ineligible under ITT 5.1	Forms ELI – 1.1 with attachments	
7	History of Non-Performing Contracts	Non-performance of a contract did not occur as a result of contractor default since 1st January 2016 in the last 5 years	Form CON-1	
8	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 19.10.	Part xiii of Form of Tender	
9	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 – 2	
10	Litigation History	No consistent history of court/arbitral award decisions against the Tenderer since *1st January 2020*	Form CON – 2	

1	2	3	*4*	*5*
Item No.	Qualification Subject	Qualification Requirement	*Document To be Completed by Tenderer*	*For Procuring Entity's Use (Qualification met or Not Met)*
11	Financial Capabilities	(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 requirements estimated as **Kenya Shillings 2.5 billion or USD 20 MILLION.** (ii) The Tenderers shall also demonstrate, to the satisfaction of the Procuring Entity, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments. (iii) 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 three(3) years shall be submitted and must demonstrate the current soundness of the Tenderer's financial position and indicate its prospective long-term profitability.	Form FIN – 3.1, with attachments	
12	Average Annual Construction Turnover	Minimum average annual construction turnover of Kenya Kenya Shillings 65 **Billion or USD 500 MILLION**, equivalent calculated as total certified payments received for contracts in progress and/or completed within the last **Five (5) years**, divided by **Five (5)** years	Form FIN – 3.2	
13	General Construction Experience	Experience in at least 2 contracts under road construction contracts in the role of Prime Contractor, JV member, sub-contractor, or management contractor in the last fifteen (15) years. Each contract shall have minimum contract amount of 80 million USD.	**4.** Form EXP – 4.1 **Experience**	
14	Specific Construction & Contract Management Experience	*vii)* Specific experience of the Contractor in contracts executed in the past fifteen (15) years., relevant to the Assignment with contractor demonstrating they have undertaken the following key activities:: *(a) Earthworks (cut or fill) total: more than 1,000,000 m^3* *(b) Asphalt concrete mixed and placed total: more than 20,000m^3* *(c) Concrete (reinforced, prestressed, etc.) total: more than 100,000m^3*	Form EXP 4.2(a)	

1	2	3	*4*	*5*
Item No.	Qualification Subject	Qualification Requirement	*Document To be Completed by Tenderer*	*For Procuring Entity's Use (Qualification met or Not Met)*
		(d) Improved Gravel or Graded crushed stone for base or subbase total: 50,000 m^3 The similarity of the contracts shall be based on Section VII, Scope of Works, specify the minimum key requirements in terms of physical size, complexity, construction method, technology and/or other characteristics.		
15	Work Methodology	Submission of a brief work methodology Giving a brief description of how you intend to carry out the work including traffic management and quality assurance of works, in not less than three (3) pages and not more than five (5) pages (typed, font 12 and single spaced).		

SUMMARY OF POST- QUALIFICATION CRITERIA

ITEM		DESCRIPTION	SCORE (Met or Not Met)
1		FINANCIAL CAPACITY	
	A	Audited Statements of account presented in the Internationally Financial Reporting Standard	(Met or Not Met)
	B	Cash flow statement (forecasts)	(Met or Not Met)
	C	Financial position	(Met or Not Met)
	D	Annual construction Turnover: Minimum average annual construction turnover of Kenya Shillings 65 Billion or USD 500 Million	(Met or Not Met)
	E	Line of Credit of Kshs. of Kenya Shillings 2.5 billion or USD 20 MILLION	(Met or Not Met)
2		EXPERIENCE	(Met or Not Met)
	A	General Experience as Contractor in the last fifteen years.	(Met or Not Met)
	B	Experience in road construction in the last fifteen years.	(Met or Not Met)
	C	Specific construction experience the last fifteen years.	(Met or Not Met)
3		CURRENT COMMITMENTS	
		Provide statement of the outstanding commitment	(Met or Not Met)
4		KEY PERSONNEL	
	A	Project Manager meeting criteria	(Met or Not Met)
	B	Deputy Project Manager meeting criteria	(Met or Not Met)
	C	Chief Design Engineer meeting criteria	(Met or Not Met)
	D	Bridge/Structural Engineer	(Met or Not Met)
	E	Materials/ Pavement engineer	(Met or Not Met)

ITEM		DESCRIPTION	SCORE (Met or Not Met)
	F	Project Surveyor	(Met or Not Met)
	G	Highway Engineer	(Met or Not Met)
	H	Safety and Environmental expert	(Met or Not Met)
5		PLANT AND EQUIPMENT	
	A	10 No. Bulldozer Cat D8 or Equivalent	(Met or Not Met)
	B	10 No. Grader Cat 14h or Equivalent	(Met or Not Met)
	C	1No. Asphalt Plant 150t/Hr	(Met or Not Met)
	D	4No. Asphalt Paver/Finisher Capable of Laying Pavement Layers to Full Width of Construction	(Met or Not Met)
	E	Roller Self Propelled 4No. 20t Pneumatic 10No. 15t Smooth Drum Vibratory 10No. 20t Sheepsfoot	(Met or Not Met)
	F	10No. Hydraulic Excavator CAT 322 or Equivalent with Rock Hammer	(Met or Not Met)
	G	10No. Wheel Loader 4WD Articulated CAT 950 or Equivalent	(Met or Not Met)
	H	5No. Low Loader 30t Capacity	(Met or Not Met)
	I	50No. Tip Truck 15t Gross Capacity	(Met or Not Met)
	J	10No. Water Tanker 9000l Capacity	(Met or Not Met)
	K	3No. Pressure Bitumen Distributor Min 5000l	(Met or Not Met)
	L	2No. Chip Spreader Self Propelled	(Met or Not Met)
	M	1No. Crusher And Associated Power Screens 150t/Hr	(Met or Not Met)
	N	10No. Mobile Concrete Mixer 6m3 Capacity Minimum	(Met or Not Met)
	M	2No. Mobile Crane 50t Capacity	(Met or Not Met)
	N	1No. Pile boring rig	(Met or Not Met)
6		WORK METHODOLOGY	(Met or Not Met)
	A	Demonstration of understanding of different works required	(Met or Not Met)
	B	Specific methodologies for different works including methodologies for traffic management, quality assuarance, environmental and health management and other methodologies for specified works	(Met or Not Met)
	C	Sequential Work scheduling/programming within the set Contract period	(Met or Not Met)
	d	Site organization chart	(Met or Not Met)
	e	Resourced Programme of Works	(Met or Not Met)
	f	Equipment mobilization schedule	(Met or Not Met)
		REMARKS	(Met or Not Met)

Tenderers must achieve MEET in all the measured parameters to qualify.

Tenderers who do not meet all the the creteria listed above will be automatically disqualified. Tendersrs who meet all the technical creteria will be subjected to financial evaluation.

SECTION IV - TENDERING FORMS

QUALIFICATION FORMS

1. TENDERER'S ELIGIBILITY- CONFIDENTIAL BUSINESS QUESTIONNAIRE
2. Form EQU: EQUIPMENT.
3. FORM PER -1.
4. FORM PER-2.
5. TENDERERS QUALIFICATION WITHOUT PRE-QUALIFICATION.
   - 5.1 FORM ELI-1.1.
   - 5.2 FORM ELI-1.2.
   - 5.3 FORM CON –2.
   - 5.4 FORM FIN –3.1.
   - 5.5 FORM FIN –3.2.
   - 5.6 FORM FIN –3.3.
   - 5.7 FORM FIN –3.4.
   - 5.8 FORM EXP -4.1.
   - 5.9 FORM EXP - 4.2(a).
   - 6.9 FORM EXP - 4.2 (a) (cont.).
   - 6.10 FORM EXP -4.2 (b).

OTHER FORMS

6. FORM OF TENDER.
7. FORM OF TENDER SECURITY - DEMAND BANK GUARANTEE.
8. FORM OF TENDER SECURITY (TENDER BOND).
9. FORM OF TENDER-SECURING DECLARATION.
10. APPENDIX TO TENDER.
11. SCHEDULE OF ADJUSTMENTS
12. Form7: Schedule of construction materials basic rates
13. Form 8: Appendix to Form of Tender
14. Form 9: Written power of attorney
15. Form 10: Certificate of Bidder's site visit

TECHNICAL PROPOSAL FORMS

Site Organization.
Method Statement.
Mobilization
Schedule.
Construction
Schedule.

QUALIFICATION FORMS

FORM 1: EQUIPMENT

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, or for alternative equipment proposed by the Tenderer.

Item of Equipment		
Equipment Information	Name of Manufacturer	Model and power rating
	Capacity:	Year of Manufacture:
Current Status	Current Status:	
	Details of Current Commitments:	
Source	Indicate Source of the Equipment Owned ☐ Rented ☐ Leased ☐ Specially Manufactured ☐	
Owner	Name of owner :	
	Address of Owner:	
	Telephone :	Contact Name and Title:
	Fax:	Telex:
Agreement	Details of Rental/Lease/Manufacture Agreement specific to the project	

FORM PER-1: Contractor's Representative and Key Personnel

1.	**Title of Position : project**	
	Name of Candidate:	
	Duration of Appointment	
	Time: Commitment for this Position	
	Expected Time Schedule for this Position	
2.	**Title of Position: Deputy Site Agent/Site Engineer**	
	Name of Candidate:	
	Duration of Appointment	
	Time: Commitment for this Position	
	Expected Time Schedule for this Position	
3	**Title of Position: Site Surveyor**	
	Name of Candidate:	
	Duration of Appointment:	
	Time: Commitment for this Position:	
	Expected Time Schedule for this Position:	
4.	**Title of Position: Materials Technologist**	
	Name of Candidate:	
	Duration of Appointment:	
	Time: Commitment for this Position:	

	Expected Time Schedule for this Position:	
5.	**Title of Position: General Foreman**	
	Name of Candidate:	
	Duration of Appointment	
	Time: Commitment for this Position	
	Expected Time Schedule for this Position	
6	**Title of Position: Earthworks Foreman**	
	Name of Candidate:	
	Duration of Appointment	
	Time: Commitment for this Position	
	Expected Time Schedule for this Position	
7	**Title of Position: Bituminous works Foreman**	
	Name of Candidate:	
	Duration of Appointment	
	Time: Commitment for this Position	
	Expected Time Schedule for this Position	
8	**Title of Position: Concrete Works Foreman**	
	Name of Candidate:	
	Duration of Appointment	
	Time: Commitment for this Position	
	Expected Time Schedule for this Position	

Form PER-2: Resume and Declaration

<table>
<tr><td colspan="3">Name of Tenderer:</td></tr>
<tr><td colspan="3">Position: Title of Position from form PER -1</td></tr>
<tr><td>Personnel Information</td><td>Name</td><td>Date of Birth</td></tr>
<tr><td rowspan="5"></td><td>Professional Qualifications

Address:</td><td>Email:</td></tr>
<tr><td>Academic Qualifications</td><td></td></tr>
<tr><td colspan="2">Language Proficiency/Language and level of speaking, reading and writing skills</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">Address of procuring Entity</td></tr>
<tr><td rowspan="4">Details</td><td colspan="2"></td></tr>
<tr><td>Telephone</td><td>Years with present procuring Entity

Contact Manager/Personnel officer</td></tr>
<tr><td colspan="2">Fax:</td></tr>
<tr><td>Job Title:</td><td></td></tr>
</table>

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

Project	Role	Duration of Involment	Relevant Experience

DECLARATION

I, the under signed [insert either "Contractor's Representative" or "Key Personnel" as applicable], certify that to the Lowest 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:

Commitments	Details
Commitment to Duration of contract	Insert period (start and end date)
Time Commitment	Insert period (start and end date)

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

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

Name of Contractor's Representative or Key Personnel: [*insert name*]

Signature:_____

Date: (day month year): _____

Countersignature of authorized representative of theTenderer:

Signature:_____

Date: (day month year): _____

1. TENDERERS QUALIFICATION WITHOUT PRE-QUALIFICATION

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

6.1 FORM ELI-Tenderer information Form

Date …….

ITT No. and title ……..

Tenderer's Name:
• In case of Joint Venture (JV): name of each member:
• Tenderer's actual or intended country of registration: (*Indicate country of constitution*)
• 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:……. • Email address:……..
1.Attached are copies of original documents of ▪ Articles of incorporation (or equivalent documents of constitution or association), and /or documents of registration of legal entity named above, in accordance with ITT 3.6 In case of JV, Letter of intent to form JV or JV agreement in accordance with ITT 3.5 ▪ In case of state –owned enterprise or institution owned or controlled by Government of Kenya, in accordance with ITT 3.8 documents establishing: 2. Included are organizational charts, a list of board of directors and the beneficial ownership.

6.2 FORM ELI-1.2 : Tenderer's JV Information Form

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

Date:……..

ITT No. and 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:
Tenderer's authorized representative information Name:…… Address:……. Telephone/ Fax Numbers:……. Email address:……..
1.Attached are copies of original documents of ▪ Articles of incorporation (or equivalent documents of constitution or association), and /or documents of registration of legal entity named above, in accordance with ITT43.6 ▪ In case of state –owned enterprise or institution owned or controlled by Government of Kenya, in accordance with ITT 3.8 documents establishing : 2. Included are organizational charts, a list of board of directors and the beneficial ownership.

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

Tenderer's Name:_____

Date:_____

JV Member's Name_____

ITT No. and title:_____

<table>
<tr><td colspan="4">Non performed contracts in accordance with section III, evaluation and qualification criteria.</td></tr>
<tr><td colspan="4">▪ Contract Non-performance did not occur since 1st January 2016 specified in section III, Evaluation and Qualification criteria, Sub-factor 2.1.

▪ Contracts not performed since 1st January, 2016 specified in section III, Evaluation and Qualification criteria, requirement 2.1.</td></tr>
<tr><td>Year</td><td>Non- performed portioned of contract</td><td>Contract identification</td><td>Total contracts amount (current Value, currency exchange rate and Kenya Shillings equivalent)</td></tr>
<tr><td>(insert Year)</td><td>(insert amount and percentage)</td><td>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)

Reasons for nonperformance (Indicate main reason(s))</td><td>(insert amount)</td></tr>
<tr><td colspan="4">▪ No-Pending litigation in accordance with section III evaluation and qualification criteria, sub factor 2.3
▪ Pending litigation in accordance with section III evaluation and qualification criteria, sub factor 2.3 as indicated below.</td></tr>
</table>

Year of Dispute	Amount of Dispute (Currency)	Contract Identification	Total Contract Amount (currency), Kenya Shilling Equivalent (exchange rate)
		Contract Identification:…… Name of Procuring Entity……... Address of Procuring Entity:……... Matter in dispute:…….. Party who initiated the dispute:…….. Status of dispute:……..	
		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 Ill, 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.			
[insert year}	*[insert 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}* Matter in dispute: *[indicate main issues in dispute}* Party who initiated the dispute: *[indicate "Procuring Entity" or "Contractor"}* Reason(s) for Litigation and award decision *[indicate main reason(s)}*	*[insert amount}*

Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount (currency), Kenya Shilling Equivalent (exchange rate)
		Contract Identification: Name of Procuring Entity: Address of Procuring Entity: Matter in dispute: Party who initiated the dispute: Status of dispute:	
		Contract Identification: Name of Procuring Entity: Address of Procuring Entity: Matter in dispute: Party who initiated the dispute: Status of dispute:	

6.4 FORM FIN –3.1: Financial Situation and Performance

Tenderer's Name:_____

Date:_____

JV Member's Name_____

ITT No. and title:_____

1.4.1 Financial Data

Type of financial information in ~~~~~~~~~~~~~~~~~~~~(Currency)	Historic information for previous ~~~~~~~~~~~~~~~~year,~~~~~~~~~~~~ (amount in currency, currency, exchange rate*, USD equivalent)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Statement of financial position (Information from Balance sheet)					
Total Asset (TA)					
Total Liabilities (TL)					
New Equity/ Net worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits before Taxes (PBT)					

Cashflow information					
Cashfow from operating activities					

*Refer to ITT 15 for exchange rate.

1.4.2 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 Shillings Equivalent)
1.		
2.		
3.		

1.4.3 Financial documents

The Tenderer and its parties shall provide copies of financial statements for the last 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 incase 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 [1] for the last 5years required above; and complying with the requirements

6.5 FORM FIN – 3.2: Average Annual Construction Turnover

Tenderer's Name:_____

Date:_____

JV Member's Name_____

ITT No. and title:_____

	Annual turnover data (construction only)		
Year	**Amount currency**	**Exchange rate**	**Kenya shilling equivalent**
[indicate year]	[inert amount and indicate currency]		
Average annual construction Turnover*			

**See section III, evaluation criteria, Sub Factor 3.2*

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

6.6 FORM FIN –3.3: Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cashflow demands of the subject contractor contracts as specified in Section III, Evaluation and Qualification Criteria.

Financial Resources		
No.	Source of financing	Amount (Kenya Shilling equivalent)
1		
2		
3		

6.5 FORMFIN–3.4: 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 letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Current Contract Commitments					
No.	Name of Contract	Procuring Entity's Contact Address, Tel	Value of Outstanding Work [Current Kenya Shilling/month Equivalent]	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [Kenya Shilling/month]
1					
2					
3					
4					
5					
6					

6.6 FORM EXP -4.1: General Construction Experience

Tenderer's Name:_____
Date:_____
JV Member's Name:_____
ITT No. and title:_____

Starting Year	Ending Year	Contract Identification	Role of tenderer
		Contract Name:_____ Brief Description of the Works performed by the tenderer: …….. Amount of contract: _____ Name of Procuring Entity: _____ Address: _____	
		Contract Name:_____ Brief Description of the Works performed by the tenderer: …….. Amount of contract: _____ Name of Procuring Entity Address: _____	
		Contract Name:_____ Brief Description of the Works performed by the tenderer: …… Amount of contract: _____ Name of Procuring Entity: _____ Address: _____	
		Contract Name:_____ Brief Description of the Works performed by the tenderer: ……. Amount of contract: _____ Name of Procuring Entity: _____ Address: _____	

6.7 FORM EXP -4.2(a): Specific Construction and Contract Management Experience

Tenderer's Name:_____

Date:_____

JV Member's Name_____

ITT No. and title:_____

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

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

Tenderer's Name:_____
Date:_____
Tenderer's JV Member Name:_____

Sub-contractor's Name[2] (as perITT34):_____
ITT No. and title:_____

All Sub-contractors for key activities must complete the information in this form as per ITT 34 and Section III, Evaluation and Qualification Criteria, Sub-Factor 4.2.

1. Key Activity No One: _
2. Key Activity No. 2
3. Key Activity No. 3

[2] *If applicable*

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 Shilling**
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)x(ii)	
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
Procuring Entity's name: Address: Telephone/fax number Email:				
Description of the Key Activities in accordance with Sub-Factor 4.2(b) of Section III				

OTHER FORMS

7. 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 CERTIFICATE OF INDEPENDENT TENDER DETERMINATION and the SELF DECLARATION OF THE TENDERER attached to this Form of Tender.

iv) The Form of Tender shall include the following Forms duly completed and signed by the Tenderer.

- *Tenderer's Eligibility-Confidential Business Questionnaire.*
- *Certificate of Independent Tender Determination.*
- *Self-Declaration of the Tenderer.*

Date of this Tender submission: [*insert date (as day, month and year) of Tender submission*] **Request for Tender No.:** [*insert identification*] **Name and description of Tender** *[Insert as pe ITT)* **Alternative No.:** [*insert identification No if this is a Tender for an alternative*]

To: [*insert complete name of Procuring*

Entity] Dear Sirs,

1. In accordance with the Conditions of Contract, Specifications, Drawings and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct and complete the Works and remedy any defects therein for the sum of Kenya Shillings [*[Amount in figures]* _____Kenya Shillings *[amount in words]*_____

   The above amount includes foreign currency amount (s) of [*state figure or a percentage and currency*] [figures]_____[words]_____

   _____

   The percentage or amount quoted above does not include provisional sums, and only allows not more than two foreign currencies.

2. We undertake, if our tender is accepted, to commence theWorks as soon as is reasonably possible after the receipt of the Engineer's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Particular Conditions of Contract.

3. We agree to adhere by this tender until_____*[Insert date],* and it shall remain binding upon us and may be accepted at any time before that date.

4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute abinding Contract between us. We further understand that you are not bound to accept the lowest or any tender you may receive.

5. We, the undersigned, further declare that:

   i) *No reservations:* We have examined and have no reservations to the tender document, including Addenda issued in accordance with ITT 8;

   ii) *Eligibility:* We meet the eligibility requirements and have no conflict of interest in accordance with ITT 3 and 4;

   iii) *Tender-Securing Declaration:* We have not been suspended nor declared ineligible by the Procuring Entity based on execution of a Tender-Securing or Proposal-Securing Declaration in the Procuring Entity's Country in accordance with ITT 19.8;

(iv) Conformity: We offer to execute in conformity with the tendering documents and in accordance with the implementation and completion specified in the construction schedule, the following Works: *[insert a brief description of the Works];*

(v) Tender Price: The total price of our Tender, excluding any discounts offered in item 1 above is: *[Insert one of the options below as appropriate]*

Option1, incase of one lot: Total price is: [*insert the total price of the Tender in words and figures, indicating the various amounts and the respective currencies*]; Or

Option2, in case of multiple lots:

a) *Total price of each lot* [*insert the total price of each lot in words and figures, indicating the various amounts and the respective currencies*]; and

b) *Total price of all lots* (sum of all lots) [*insert the total price of all lots in words and figures, indicating the various amounts and the respective currencies*];

(vi) Discounts: The discounts offered and the methodology for our application are:

The discounts offered are: [*Specify in detail each discount offered.*]

(vii) The exact method of calculations to determine the net price after application of discounts is shown below: [*Specify in detail the method that shall be used to apply the discounts*];

(viii) *Tender Validity Period:* Our Tender shall be valid for the period specified in TDS 18.1 (as amended, if applicable) from the date fixed for the Tender submission deadline specified in TDS 22.1(as amended, if applicable), and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(ix) *Performance Security:* If our Tender is accepted, we commit to obtain a Performance Security in accordance with the Tendering document;

(x) *One Tender Per Tender:* We are not submitting any other Tender(s) as an individual Tender, and we are not participating in any other Tender(s) as a Joint Venture member or as a subcontractor, and meet the requirements of ITT3.4, other than alternative Tenders submitted in accordance with ITT 13.3;

(xi) *Suspension and Debarment:* We, along with any of our subcontractors, suppliers, Engineer, 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 Public Procurement Regulatory Authority or any other entity of the Government of Kenya, or any international organization.

(xii) *State-owned enterprise or institution:* [*select the appropriate option and delete the other*] [*We are not a state- owned enterprise or institution owned or controlled by Government of Kenya*]/[*We are a state-owned enterprise or institution owned or controlled by Government of Kenya but meet the requirements of ITT 3.7*];

(xiii) *Commissions, gratuities, fees:* We have paid, or will pay the following commissions, gratuities, or fees with respect to the tender 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.")

(xiv) *Binding Contract:* We understand that this Tender, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;

(xv) *Not Bound to Accept:* We understand that you are not bound to accept the lowest evaluated cost Tender, the Most Advantageous Tender or any other. Tender that you may receive;

(xvi) *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;

(xvii) *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.

(xviii) We undertake to adhere by the Code of Ethics for Persons Participating in Public Procurement and Asset Disposal, during the procurement process and the execution of any resulting contract.

(xix) 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.

c) Self-Declaration of the Tenderer– to declare that we will, if awarded a contract, not engage in any form of fraud and corruption.

d) Declaration and commitment to the Code of Ethics for Persons Participating in Public Procurement and Asset Disposal.

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*]

Signatureof 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*]

Notes
** In the case of the Tender submitted by joint venture specify the name of the Joint Venture as Tenderer*
*** Person signing the Tender shall have the power of attorney given by the Tenderer to be attached with the Tender,*

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.

i) Tenderer's details

S/No.	ITEM	DESCRIPTION
1	Name of procuring entity	
2	Reference number of the tender	
3	Date and time of tender opening	
4	Name of tenderer	
5	Full Address and Contact Details of Tenderer	1. Country. 2. City. 3. County. 4. Building. 5. Floor. 6. Postal Address. 7. Name and email of contact person.
6	Current Trade License Registration Number and Expiring date	
7	Name, county and full address (postal and physical addresses, email and telephone number) of Registering Body/Agency	
8	Description of Nature of Business	
9	Maximum value of business which the Tendered handles	
10	State if Tenders Company is listed in stock exchange, give name and full address (postal and physical addresses, email and telephone number) of state which stock exchange	

General and Specific Details

ii) **Sole Proprietor,** provide the following details.

Name in full_____Age_____

Nationality_____Country of Origin_____

Citizenship _____

iii) **Partnership,** provide the following details.

	Name of Partners	Nationality	Citizenship	%Shares owned
1				
2				
3				

(iv) **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 Director	Nationality	Citizenship	%Shares owned
1				
2				
3				

(v) **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			

ii) Conflict of interest disclosure

	Type of Conflict	Disclosure YES or NO	If YES, provide details of the relationship with Tenderer
1	Tenderer is directly or indirectly controlled by 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	Tenderer has another relationship with another tenderer, directly or indirectly 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 if the design or technical specifications of the works that are subject of the tender.		
6	Tenderer would be providing goods, 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 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 contract.		
9	Has the conflict stemming from such relationship stated in item 6 and 7 above been resolved in a manner acceptable to the Procuring Entity throughout the tendering process and execution of the Contract.		

(vi) 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___

_____[Name of Procuring Entity]

for:_____[Name and number of tender]

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 theTender 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 [check 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) theTenderer 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_____

Title_____

Date_____

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

SELF-DECLARATION FORMS

FORM SD1: 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

Site visit

FORM SD2: 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/PrincipalOfficer/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

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.....

D. 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

2.1 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.

2.2 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.

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

a) Defines broadly, for the purposes of the above provisions, the terms set forth below as follows:

i) "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

ii) "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;

iii) "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

v) "obstructive practice" is:

- deliberately destroying, falsifying, altering, or concealing of evidence material to theinvestigation 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 award[1] 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 inspect[2] 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 Fraudand 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.*

2. FORM OF TENDER SECURITY - DEMAND BANK GUARANTEE

Beneficiary:_____

Request for Tenders No:_____

Date:_____

TENDER GUARANTEE No.:_____

Guarantor: _____

1. We have been informed that_____(herein after called "the Applicant") has submitted or will submit to the Beneficiary its Tender (herein after called "the Tender") for the execution of

   _____under Request for Tenders No._____("the ITT").

2. Furthermore, we understand that, according to the Beneficiary's conditions, Tenders must be supported by a Tender 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_(_____) 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 Letter of Tender ("the Tender Validity Period"), or any extension there to 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 thereto provided by the Applicant, (i) has failed to execute the contract agreement, or (ii) has failed to furnish the Performance.

4. 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, 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.

5. 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)]

3. **FORM OF TENDER SECURITY (TENDER BOND) [The Surety shall fill in this Tender Bond Form in accordance with the instructions indicated.] BOND NO._____**

1. BY THIS BOND *[name of tenderer]* as Principal (herein after called "the Principal"), and *[name, legal title, and address of surety],* authorized to transact business in *[name of country of Purchaser],* as Surety (herein after called "the Surety"), are held and firmly bound unto *[name of Purchaser]* as Obligee (herein after called "the Purchaser") in the sum of *[amount of Bond]*[5] *[amount in words]*, for the payment of which sum, well and truly to be made, we, the said Principal and Surety, bind ourselves, our successors and assigns, jointly and severally, firmly by these presents.

2. WHERE AS the Principal has submitted or will submit a written Tender to the Purchaser dated the_ Day of_____, 20, for the supply of *[name of Contract]* (herein after called the "Tender").

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

(a) Has withdrawn its Tender during the period of Tender validity set forth in the Principal's Letter of Tender ("the Tender Validity Period"), or any extension thereto provided by the Principal; or

(b) having been notified of the acceptance of its Tender by the Purchaser during the Tender Validity Period orany extension thereto provided by the Principal; (i) 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 Purchaser's Tenderingdocument.

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

4. The Surety hereby agrees that its obligation will remain in full force and effect upto and including the date 30 days after the date of expiration of the Tender Validity Period set forth in the Principal's Letter of Tender or any extension thereto provided by the Principal.

5. IN TESTIMONY WHEREOF, the Principal and the Surety have caused these presents to be executed in their respective names this day of_____20.

Principal: _____ Corporate Seal (where appropriate)

Surety:_____

(Signature)
(Printed name and title)

(Signature)
(Printed name and title)

[5] *The amount of the Bond shall be denominated in the currency Kenya shillings or the equivalent amount in a freely convertible currency.*

4. FORM OF TENDER-SECURING DECLARATION

[The Bidder shall complete this Form in accordance with the instructions indicated]

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

Tender No.:..... . *[insert number of tendering process]*

To:..... *[insert complete name of*

Purchaser] I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, bids must be supported by a Tender-Securing Declaration.

2. I/We accept that I/we will automatically be suspended from being eligible for tendering in any contract with the Purchaser for the period of time of [insert number of months or years] starting on [insert date], if we are in breach of our obligation(s) under the bid conditions, because we–(a) have withdrawn our tender during the period of tender validity specified by us in the Tendering Data Sheet; or (b) having been notified of the acceptance of our Bid by the Purchaser during the period of bid validity, (i) fail or refuse to execute the Contract, if required, or (ii) fail or refuse to furnish the Performance Security, in accordance with the instructions to tenders.

3. I/We understand that this Tender Securing Declaration shall expire if we are not the successful Tenderer(s), upon the earlier of:
   a) our receipt of a copy of your notification of the name of the successful Tenderer; or
   b) thirty days after the expiration of our Tender.

4. I/We understand that if I am/we are/in a Joint Venture, the Tender Securing Declaration must be in the name of the Joint Venture that submits the bid, and the Joint Venture has not been legally constituted at the time of bidding, the Tender Securing Declaration shall be in the names of all future partners as named in the letter of intent.

Signed:……..…

Capacity / title (director or partner or sole proprietor,

etc.) …….…….

Name:……

Duly authorized to sign the bid for and on behalf of: *[insert complete name*

of Tenderer] Dated on……. day of…….…… *[Insert date*

of signing]

Seal or stamp

5. Appendix to Tender

Schedule of Currency requirements

Summary of currencies of the Tender for_____*[insert name of Section of the Works]*

Name of Currency:	*Amount payable*
Local currency: _____	
Foreign currency #1: _____	
*Foreign currency #2:*_____	
*Foreign currency #3:*_____	
Provisional sums expressed in local currency _____	*[To be entered by the procuring entity]*

6. TECHNICAL PROPOSAL

The tender shall complete these sections as a Technical proposal to indicate how he/she intends to proceed with the works. The Procuring entity will review these Proposals and determine the extent to which they meet the required standards to complete the works.

6.1 Site Organization

[insert Site Organization information]

6.2 Method Statement

[insert Method Statement]

6.3 Mobilization Schedule

[insert Mobilization Schedule]

6.4 Construction Schedule

7. Form 8: APPENDIX TO FORM OF TENDER

CONDTITIONS	GCC CLAUSES	DATA
Employer's Name and Address	1	DIRECTOR GENERAL, KENYA URBAN ROADS AUTHORITY, BARABARA PLAZA, BLOCK D, P.O. BOX 41727-00100, NAIROBI Tel. No.: +254 – 020 - 8013844/0717105233 dg@kura.go.ke
Date of Commencement	1.1.3.2 & 8.1	The Date of Commencement shall be no later than 28 days from date of Letter of Commencement issued by the Employer's Representative subject to approval of the Construction Document, right of access to the site having been given to the contractor and payment to Contractor of theFirst Installment/Advance payment.
Time for Completion	1.1.3.3 & 8.2	36 months from the Commencement Date.
Defects Notification Period	1.1.3.7	12 months.
Reasonable Profit	1.1.4.9	Add new Sub-Clause 1.1.4.9: Reasonable Profit shall be deemed to constitute a sum equal to 10% of the Costs in each instance where these words are used. in Sub-clauses 7.4, 10.3, 11.8 and 13.3.
Variation	1.1.6.8	The Variation shall not exceed 25% of the Contract Price.
Law and Languages	1.4	Laws of the Republic of Kenya; English Language.
Amount of Performance Security	4.2	10% of the Contract Price in the form of an Unconditional Bank Guarantee, acceptable to the Employer.
Technical Standards and Regulations	5.4	The design, construction and tests shall comply with relevant technical standards currently in effect in Kenya, including but not limited to the Road Design Manual and the Standard Specifications for Roads and Bridges. Where technical standards for Kenya are not available, alternative equivalent standards from other countries also may be accepted by the Employer.
Amount of Delay Damages	8.7	0.01% of the Contract Price for each day of delay, subject to a maximum of 3% of the Contract Price.
Variation Procedure	13.3	The Variation and the adjustments to the Contract Price shall be not more than 25% of the Contract Price.
Advance Payment	14.2	The Advance Payment should be 20% of the Contract Price. Deductions shall commence in the next interim Payment Certificate following that in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds twenty percent (20%) of the Accepted Contract Amount less Provisional Sums and completed by eighty percent (80%) total of all certified interim payments.

CONDTITIONS	GCC CLAUSES	DATA
Percentage of retention	14.3(c)	Percentage of retention is 5% of the Instalment Value.
Limit of Retention Money	14.3(c)	Limit of retention is 5% of the Contract Price.
Currencies of Payment	14.15	As stipulated in the Loan Agreement between Government of Kenya and the Financial institution.
Insurance against Injury to Persons and Damage to Property	18.3	KShs. 10,000,000 (Kenya Shillings Ten Million only) per occurrence, with the number of occurrences unlimited.
Dispute Adjudication Board	20	Refer to Clause 20 in PCC.

8. Form 9: FORM OF WRITTEN POWER OF ATTORNEY

The Bidder shall state here below the name(s) and address of his representative(s) who is/are authorized to receive on his behalf correspondence in connection with the Bid.

……..
(Name of Bidder's Representative in block letters)

……..
(Address of Bidder's Representative)

……..
(Signature of Bidder's Representative)

Alternate:

……..
(Name of Bidder's Representative in block letters)

……..
(Address of Bidder's Representative)

……..
(Signature of Bidder's Representative)

*To be filled by all Bidders.

*Both representative and alternate **must** attach copy of National Identification card or Passport.

9. Form 10: 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 organised inspection visit of the site of the works for the (Name of Tender)
……

TENDER No.: KURA/DEV/HQ/252/2025-2026……. 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.

PART 2 - WORKS' REQUIREMENTS

SECTION V - BILLS OF QUANTITIES

SECTION VI - SPECIFICATIONS

SECTION VI –A: STANDARD SPECIFICATIONS

Standard Specifications refers to the Standard Specifications for Road and Bridge Construction, 1986 Edition and shall be applicable in this contract.

SECTION VI –B:SPECIAL SPECIFICATIONS

DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI (B32) ROAD:

100 SECTION 13: SPECIAL SPECIFICATIONS

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100 GENERAL

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

In the absence of any definite provisions on any particular issue in the aforesaid Specifications, reference may be made to the latest codes and specifications of Design Manual for Roads and Bridges of the Ministry of Transport and communication of the Republic of Kenya, Kenya Bureau of Standards (KeBS), BS, ASTM, AASHTO and in that order. Where even these are silent, the construction and completion of the works shall conform to sound engineering practice as approved by the Engineer and in case of any dispute arising out of the interpretation of the above, the decision of the Engineer shall be final and binding on the Contractor.

Where reference is made in the Contract to specific standards codes to be met by the materials, plant, and other supplies to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards as on the date of the bid and codes/design manual in effect shall apply, unless otherwise expressly stated in the contract. Where such standards and codes/design manual are national, or relate to a particular country or region, other internationally recognised standards which ensure a substantially equal or higher performance than the standards and codes/design manual specified will be accepted subject to the Engineer's prior review and written approval. The difference between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the Engineer at least 28 days prior to the date when the Contractor desires the Engineer's approval. In the event that the Engineer determines that such proposed deviations do not ensure substantially equal performance, the Contractor shall comply with the standards specified in the documents.

101 Location and Extent of Site

The project is located in Nairobi and Kiambu Counties in Kenya. The entire project encompases approximately 23.5 km of road network (including bypasses, loops and accesses) and commences at Muthaiga Interchanges along Thika Road (A2) and proceeds in the Northerly direction through Kiambu Town ending at Ndumberi. The road traverses an urban and peri-urban development setup which is densely populated. It passes through the ecologically important Karura Forest and serves important installations, institutions and developments including NIS Headquaters at Karura, Kiambu Institute of Technology, Ridgeways shopping centre, Thindigwa shopping centre, several police stations, schools and shopping malls. It cuts right across Kiambu Town and proceeds in a North Westerly direction terminating 1.5km past Ndumberi Town.

Schedule of Major Roads

S/No.	Road Name	Road length (Km)
1	Muthaiga-Kiambu-Ndumberi (B32) Road	17 km
2	Kiambu – Eastern Bypass	2.5 km
3	Kiambu – Western Bypass	2 km
4	Kiambu – Southern Bypass	2 km
	Total Length	23.5 km

The Authority therefore sought to procure Contractors with the requisite capacity for and be responsible for their obligations during construction works. The Contracting firm shall perform its duties for a period of Three (3) years.

- **Major Technical Parameters:**

  Class of Highway: Class B National Trunk Highway

  Design Flood Return Period: 50 years

  Subgrade Width: 21 meters (General section), 28 meters (Town section EK10+000-EK12+500)

  Width of Carriageway: 2 x 2 x 3.5 meters (Town section: 2 x 3 x 3.5 meters)

  Width of Shoulder: 2 x 2 meters

  Stopping Sight Distance: 120 meters

  Min. Radius of Hor. Curve: 350 meters

  Maximum Gradient: 5%

  Design Vehicle Load on Bridges and Culverts: BS5400HA Load, 30 units HB Load

  Bridge Width: 25.5meters (12m-Existing bridge +1.5m-median space+12m-New bridge)

- **New Pavement layers:**

  (1) Carriageway Pavement Structure:

  Asphalt Surface Dressing: 10 mm

  Asphalt Concrete: 50 mm

  Dense Bitumen Macadam: 125 mm

  Cement Stabilized Graded Crushed Stone (Cement Ratio: 2%-4%): 150 mm

  MDD 100% Subgrade: 300 mm

  Total Pavement Thickness: 635 mm

  (2) Pavement Structure of Ramp Road:

  Surface Dressing: 10 mm

  Asphalt Concrete: 50 mm

  Dense Bitumen Macadam: 125 mm

  Cement Stabilized Graded Crushed Stone (Cement Ratio: 2%-4%): 175 mm

  MDD 100% Subgrade: 300 mm

  Total Thickness: 660 mm

DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI (B32) ROAD:

- **Bridge Structures**

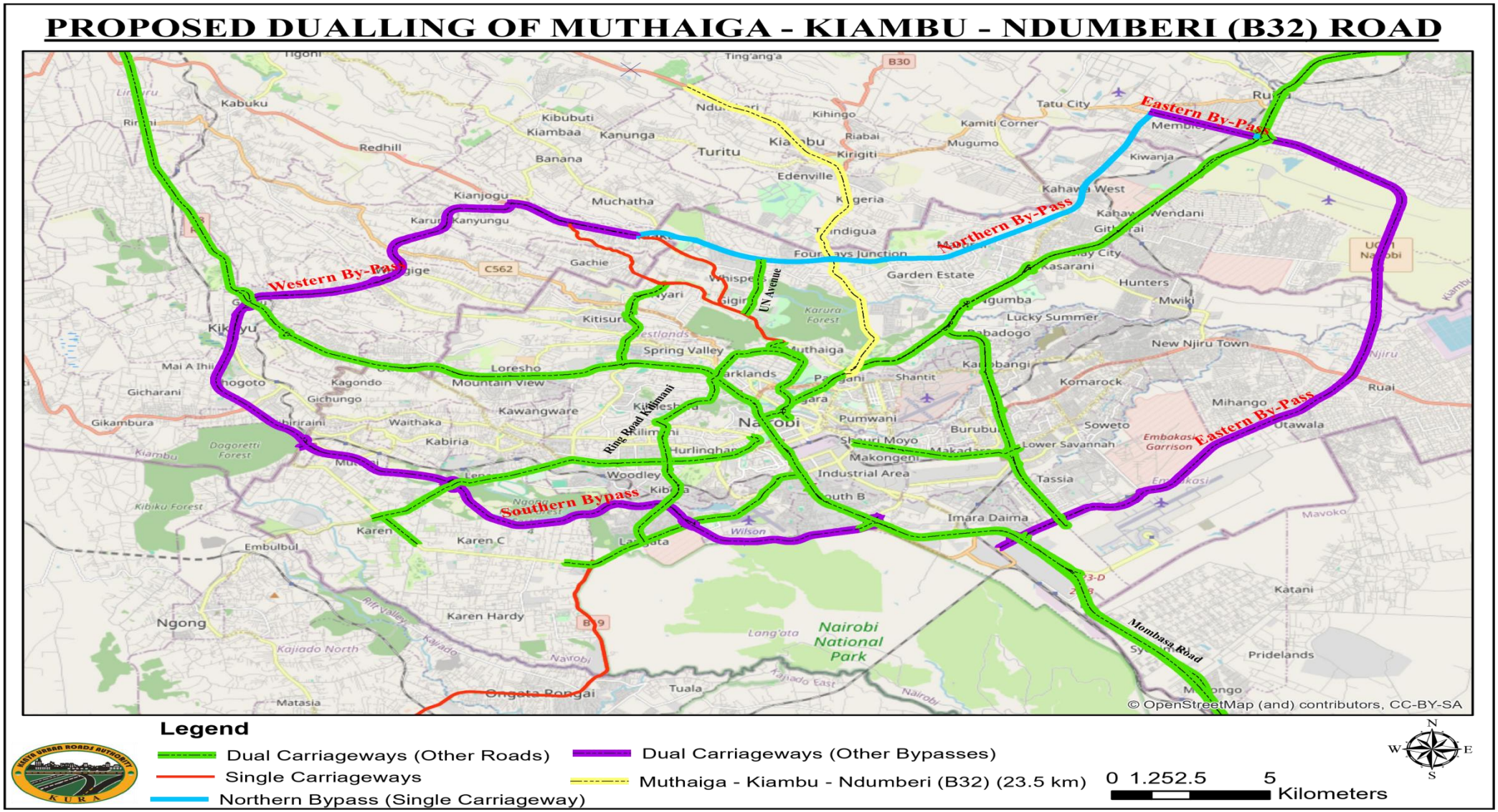
(1) Design Parameters

Design Vehicle Load: BS 5400 HA Load, 30 units HB Load

Clearance: the same as the current bridge clearance

Design Flood Frequency: 1/50 for bridge

DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI (B32) ROAD:



The site of the works shall be within the road reserve and any other places as may be designated in the Construction Contract.

102 Extent of Contract

The works comprise upgrading of Muthaiga-Kiambu-Ndumberi Road (B32) which is a 7m wide, 2 lane single carriage way road to a dual carriageway. The project encompasses Three roads to serve as bypasses to Kiambu Town, Kirigiti and Ndumberi Markets. The two bypass roads are Eastern bypass (Riabai – Kiriguini B) and the western bypass (Githunguri road- Sasini –Kiratina- Boma Road).

102.1 Projects Components

The schemes proposed in this contract are as follows:

1. Muthaiga-Kiambu-Ndumberi (B32) Road -Dual carriageway-17km

   Muthaiga Interchange- NSIS- Northern Bypass:
   Main carriageway : 2 lanes on either side
   Service roads : 2 lanes on either side
   NMT : 3m wide lane on either side

   Northern Bypass-Thindigua-Kirigiti JCT
   Main carriageway : 2 lanes on either side
   Service road : 2 lanes on either side
   NMT : 3m wide lane on either side

   Kirigiti JCT-Kiambu Town
   Main carriageway : 2 lanes on either side
   NMT : 3m wide lane on either side

   Kiambu Town (Governor’s office)-Ndumberi- Sasini Coffee
   Main carriageway : 2 lanes on either side
   NMT : 3m wide lane on either side

2. Southern Bypass: Kimiti Road Kiambu High School junction to Kirigiti Roundabout
   Main carriageway : 2 lanes on either side (Dual Carriageway)
   NMT : 2m wide lane on either side

3. Eastern Bypass: Riabai- Ndumberi:
   Main carriageway : 2lane, 2-way carriageway (Single carriageway)
   NMT : 2m wide lane on one side

4. Western Bypass: Ndumberi- Boma -Kirigiti:
   Main carriageway : 2lane, 2-way carriageway (Single Carriageway)
   NMT : 2m wide lane on one side

Improvement of Identified access and Spur Roads

The above schemes shall incorporate:

- A median for future BRT corridor
- Interchanges or U-turns near Tala Road Junction, Ridgeways, Northern bypass intersection, Thindigua, Krigiti Road Junction.
- Retaining walls on cut and embankment sections (to restricts works to the available road reserve)
- Slip roads where necessary
- Minor Drainage structures (pipe culverts, side drains and other minor structures)
- Footbridges (apart from bypass roads)
- Bridges and box culverts
- Grade separation structures (Overpasses and Underpasses)
- Road furniture

102.2 Scope of Work

The scope of the work shall include the following:

- General and Preliminaries
- Site clearance and Topsoil stripping
- Earthworks
- Excavation and filling for structures
- Culverts and drainage structures
- Passage of traffic (Traffic management during the works)
- Natural Gravel for subbase
- Graded Crushed stone
- Cement and Lime treated materials
- Asphalt Concrete and Bituminous works
- Construction of Bridges and Box Culverts

DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI (B32) ROAD:

- Construction of grade separation structures
- Construction of foot bridges
- Installation of Road furniture
- Street lighting
- Environmental and social safeguards
- Road safety
- Maintenance of the works during construction and 12 months Defect Liability Period.

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

104 Programme for Execution of the Works

The Contractor shall provide detailed and resourced works programme, required under Clause 14.1 of the Conditions of Contract, within 28 days of receipt of the Engineer's Order to commence work. A cash flow projection shall also be provided.

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 Works of 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.

105 Order of Execution of the 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 completed work is achieved.

Generally, the Contractor shall commence the works at the beginning of the road package and progress continuously towards the other end without leaving any isolated section or sections of road uncompleted.

107 Certificate of Completion

Wherever the "Certificate of completion" and "Period of Maintenance" are stated in the specification, these shall be read respectively as the "Taking Over Certificate" and "Defects Liability Period".

The Taking-Over Certificate for these works shall be issued upon application by the Contractor under Clause 48.2 of the Conditions of Contract on substantial completion of the construction works. The Defect Liability Certificate will be issued after the end of the Defects Liability Period.

Release of Retention Money will be on issuance of the said certificates.

108 Method of construction

Add the following to this clause:

The submissions of Work Programme, Order of Work and the General Description of works shall be consistent in presentation and content when handed over for the Engineer's approval and in accordance with programmes and schedules as stated in
Clause 14.1 of Conditions of Contract.

Notwithstanding any contrary provision contained in the last paragraph of Clause

108 of the Standard Specification, the Engineer's normal working hours shall be defined as 8:00 a.m. to 5:00 p.m. on weekdays, including lunch break from 1.00 p.m. to 2.00 p.m. and 8:00 a.m. to 1:00 p.m. on Saturdays, with Sunday being set aside as a day of rest. If the contractor wishes to execute permanent works outside these hours, he shall request for and obtain written permission from the Engineer at least one full working day in advance to enable the Engineer to make necessary provision for the supervision of such work. The contractor shall meet any costs arising thereof.

109 Notice of Operations

Name the existing text as 109.1 and add the following:

109.2 Notification Terms
It shall be the Contractor's responsibility to notify the Engineer when any items of the Works scheduled are completed and ready for approval, and the contractor shall give a notice of one full working day to allow control tests to be performed.

117 Health, Safety and Accidents

Insert Sub-clause (i):

In accordance with the laws of Kenya, the Contractor shall make arrangement for awareness programme for public health education and particularly for HIV/AIDS as detailed under Section 26 of this specification.

119 Use of Explosives

Add the following to Clause 119:

The Contractor shall not use explosives without prior written consent of the Engineer. Where the use of explosives is so provided or ordered or authorised, the Contractor shall comply with the requirements of the following beside the law of the land as applicable:

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

The Contractor shall pay all license fees and charges, which may be, required for storage of explosives or in respect of any other matters whatsoever.

The contractor shall be solely responsible for provision, supply, handling, storage and transportation of all explosive ancillary materials and stores and all other things of every kind whatsoever required for blasting operations and shall not delegate or subcontract these activities without the approval of Engineer.

Before the beginning of the Defects Liability Period the Contractor shall remove all unused explosives from the site on completion of the Works or which are ordered by the Engineer, and submit to the Engineer written confirmation of compliance with the instruction.

The Contractor shall submit to the Engineer monthly returns detailing the quantity of explosives brought to the site together with the quantities used during the month and the location and quantity of rock blasted.

120 Protections of Existing Works and Services

Add the following to this Clause:

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 tender rates by the Contractor.

Any damage to, or interference with, existing utilities, caused by the Contractor's operations during the progress of the Works, shall be deemed to be the responsibility of the Contractor who shall undertake to make good at his own expense any damage so caused to the existing underground utilities or other features. The Contractor shall be liable in respect of all claims arising from such damages or interference that may occur.

The Contractor shall be responsible for arranging in liaison with the relevant authorities as soon as the requirements are known for the moving of or alterations to services including power lines, telephone lines, data cables, water mains, sewers and surface water drains which are affected by the works. The arrangements for such moving or alteration shall be subject to the agreement of the Engineer and the relevant authorities.

121 Diversion of services

Add the following to the existing text:

The Contractor shall acquaint himself with the position of all existing services including sewers, water pipes, underground drains, cable for electricity and telephone lines, telephone and lighting poles before commencing any excavation or other work likely to affect these existing services.

The Contractor shall pay any charges arising from the moving of such services for which Provisional Sums have been included in the Bill of Quantities. Subject to the agreement of the Engineer and upon production of receipts, the Contractor shall be reimbursed in Interim Certificates the net cost of such moving or alteration plus the percentage inserted in the Bill of Quantities for all costs and profits in making the payments.

The Contractor shall be entirely responsible for and shall repair at his own cost, any services that may be damaged by his plant, equipment or personnel for not following the laid down procedure of locating and shifting services or damage that may occur subsequent to alteration of such services. The Contractor shall indemnify the Employer against claims arising from damages to existing services or works.

123 Liaison with Government Officials and Police

Add the following to the existing text:

In addition to the requirements of maintaining liaison with Government Officials and Police, the Contractor shall be responsible for acquainting himself with all current and valid ordinances or regulations which may affect the work.

The Contractor's attention is also drawn to his obligations with regard to inspection and examination of the site as stipulated under Clause 11 of the Conditions of Contract.

124 Provision of land

Notwithstanding the provisions of Clause 124 of the Standard Specification, all requirements of land for deviations, quarries, stockpiles, spoil areas and borrow pits when not in the road reserve but required for the construction purposes shall be approved by the Engineer, but the Contractor will

make necessary arrangements with the property owners concerned and pay all charges arising thereof on or before completion of the Contract. However, the Employer shall not provide any land for the Quarries, stockpiles, spoil areas and borrow pits and access roads there to.

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 is reasonable and practicable. No separate payment shall be made to the Contractor on account of these items and the contractor shall make due allowances for them in his rates elsewhere.

Any encroachment of the road reserve, for example by kiosks, shall be brought to the Engineer's attention by the Contractor at the earliest opportunity.

125 Water Supply

Add the following to this clause:

The Contractor at his own cost shall obtain necessary permissions from both relevant Government authorities and private parties to draw water from natural sources and private sources respectively.

127 Information from Exploratory Boring and Test Pits

Delete the contents of Clause 127 and substitute with the following:

The Materials Report prepared by the Employer does not form part of the bid documents. However, the report will be made available for the Contractor's verification only and any conclusions in regard to suitability of material, location of borrow pits and material quantities made by the Contractor based on this information, will be his own responsibility.

The Contractor shall allow in his programme for construction of 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 change of method or equipment deems 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 test on them.

At least fourteen (14) days before the work of laying any pavement layer is commenced the Contractor shall construct a trial at least 100 m in length and to the full construction width and shall be laid to the specified depth for the material. For each trial 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 **Employer's representative**

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.

131 Signboards

Add the following to this clause:

At the commencement of works, the Contractor shall provide and erect signboards; two on each end of the proposed Project Roads and or as shall be instructed by the Employer's representative. The signboards shall comply with the requirements and detail shown in the Book of Drawings. Any amendments to the details in the Book of Drawings, prior to the signboards being erected, shall be with the approval of the **Employer's representative**

132 Employer's representative accommodation, Office, Laboratory, Equipment & Furniture

The Contractor shall provide, erect and maintain for the duration of the Contract, the Employer's representative housing, offices and laboratories. A description of the accommodation, offices and laboratories is given below.

In all cases the Contractor shall furnish, equip and maintain the buildings until the expiry of the Defects Liability Period.

At the end of the Contract, all Employer's representative offices, houses and laboratory shall revert to the Contractor. The office furniture/equipment and laboratory furniture shall revert to the Contractor while the laboratory equipment shall revert to the Employer at the end of the Contract.

132.4 Employer's representative office

The Contractor shall provide and maintain for the duration of the Contract, an office for the Employer's representative of weather proof construction, with windows, and doors suitably insulated against heat and cold, all to the satisfaction of the Engineer in respect of the condition, design and siting. The office shall be partitioned as shown on the drawings or as directed by the Engineer, with a clear inside height of 2.7 m. The floor shall be of steel floated concrete adequately damp and ant proofed. The walls shall be plastered and, if necessary, painted with two coats of emulsion paint. The ceiling shall be soft board with 2 coats of paint. The layout requirement is shown on the drawings.

The office of the Engineer shall be completely separate from that of the Contractor. The Plot shall be not less than 2,500 m² in area and shall be fenced with a 2 m high barbed wire fence and gate with padlock and chain.

Telephones shall be provided as necessary for the sole use of the Employer's representative and the offices shall be provided with Electric lighting and wall sockets all to the satisfaction of the Engineer.

Portable water supply shall be provided and all toilets shall be water borne However where latrines are provided, they shall be sanitary in nature and in construction. Was hand facilities including running water and soap shall be provided in whichever case. A stand pipe with a lockable tap shall be provided outside the sanitary facilities and shall have water supply.

The offices shall be wired for main electricity and connected to a main supply. In addition, a stand by generator of approved type shall be provided, located to the satisfaction of the Engineer.

Furniture and equipment for the Employer's representative Office shall be as listed in the Special Specifications.

The Engineer's office and Laboratory shall and shall revert to the contractor. Office, survey and laboratory equipment and furniture shall revert to the Employer.

132.5 Employer's representative Main Laboratory

The contractor shall provide, erect and maintain for the duration of the Contract, a laboratory adjacent to the **Employer's representative** office. The laboratory shall be of construction type similar to the Engineer's office. The requirements of the Engineer's laboratory are shown on the drawings.

The laboratory shall have piped potable water supply and continuous electricity supply adequate for lighting, heating and operating the laboratory equipment. Laboratory equipment shall be protected against power surges. The contractor shall be responsible for installation of power surge and lightening arrestors and shall include this in his rate for the provision of laboratory structure.

The laboratory shall have a clear floor to ceiling height of not less than 2.75 m. All rooms shall be fitted with electric lighting and power points as instructed by the Engineer. Each door shall be fitted with two mortice locks and provided with two keys. External doors and all windows shall be fitted with fly screens.

Soaking tanks for CBR specimens shall be provided at floor level in an exclusive section of the Laboratory. Concrete cube curing tanks of adequate size shall be provided and secured against external interference. Both the CBR tanks and concrete cube curing tanks shall have drainage pipes built-in.

The Engineers office shall be located reasonably away from sources of noise such as concrete/ bitumen plants, workshops, materials stockpiling areas, hard stone section of then laboratory etc.

The following rooms and facilities shall be provided in the laboratory:

Office/s
This room/s shall have a total floor area of not less than 22 m² and a total window area of not less than 2 m². The floor shall be concrete with a float finish.

A display board of soft-board or similar approved material shall be provided and fixed securely to the wall at a location to be indicated by the **Employer's representative**

Main Laboratory Room
This room shall have a total floor area of not less than 55 m² and a total window area of not less than 7 m². The external entrances shall be a double door and single doors shall be provided for access to adjacent offices.

The permanent fixtures in the Laboratory shall include three double draining board stainless steel sinks, piped potable water supply to each and waste water outlets. The room shall be fitted with 3 rigidly constructed work benches 0.9 m high by 1.0 m wide and with a top comprised of either metal lined hardwood or steel float finished concrete (at least 75 mm thick and suitably reinforced) A total length of workbenches approximately of 15 m shall be provided. Wall shelves 450 mm wide and having a surface area of at least 6 m² shall be provided and securely fitted.

Concrete plinths suitable for mounting the cube crusher and CBR load frame shall also be provided.

Two display boards made of soft-board or other approved material, each with a minimum area of 3 m² shall be securely fixed to the walls as directed by the **Employer's representative**

Small Laboratory Room
A small laboratory room shall be provided. This room shall have a total floor area of not less than 20 m². A door shall provide access to the main laboratory room. The floor shall be fitted out as indicated by the Engineer with two rigidly constructed work benches constructed to the same standard of construction as the main laboratory room. The work benches shall be at least 6 m long. A sink with waste pipe shall be connected to the water supply of the main laboratory room. In addition, an approved air extractor shall be fitted through an outside wall.

Store room
A separate sample store of at least 20 m² floor area and with shelves along one wall, shall be provided in a position to be directed by the **Employer's representative**

Concrete Slab
A concrete slab, 150 mm thick with a total area of not less than 20 m², shall be provided adjacent to the main laboratory building in a position to be directed by the Engineer. The slab shall have a smooth finish all to the satisfaction of the **Employer's representative**

Bitumen Tests Room

A separate room of floor area of at least 11m2 well ventilated for bitumen tests. It shall be fitted with a vented hood to evacuate fumes. The hood shall be at least as wide as the working bench and the fume chute shall project at least 1m above the roof.

Alongside provision of the office and laboratory, adequate parking for the office shall be provided. Covered parking shades for at least 6 vehicles shall be made available.

132.7 Employer's representative Office and Laboratory Furniture

Furniture and equipment for the Engineer's Laboratory shall be as listed in the Special Specifications. It shall also be the Contractor's responsibility to replenish consumables when instructed by the Engineer. The Engineer's office and laboratory furniture will revert to the Employer on completion of

the contract. Rate for provision of the Engineer's main office shall include provision of all furniture, consumables and equipment listed in the Special Specifications.

132.8 Employer's representative Office, Laboratory and Survey Equipment

General
The Contractor shall provide, install and maintain in a good state of repair for the duration of the Contract, such office, laboratory, survey and other equipment as listed in the Special Specifications. Such equipment shall be of approved manufacturer and shall be made available to the Engineer within the following time periods:

Survey equipment, not more than 30 days after the Engineer's Order to Supply
Laboratory equipment, not more than 60 days after the Engineer's order to Supply

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

The laboratory and survey equipment shall revert to the Employer on completion of the Contract.

The items listed in appendix to bill item 1.04 of the BOQ which constitute office furniture and equipment shall be supplied to the Engineer's office. On completion of the contract all furniture and equipment specified which will have been supplied shall revert to the employer. The rate for provision of furniture and equipment to Engineer's main office shall include provision, maintenance and replenishing/replacing the items and equipment in the appendix.

The contractor shall be responsible throughout the contract period for the maintenance of the office, its equipment and furniture and providing security all times for the duration of the Contract as specified in clauses 132 and 141 of the standard specifications.

All payments for the office are subject to retention.

The contractor will be paid 50% of the rate quoted on provision of the office complete with furniture and equipment and the remaining 50% of the rate to be spread within the contract period as stipulated in the standard specifications for road and bridge construction.

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 extra items not in the Specifications 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: (The rate for provision of these equipment shall be included in the rate for provision of the Engineer's office and no extra amount shall be claimed for these items.)

Item Description	No.	Comment
FHD 1080P 24MP 16X Digital Zoom Remote Control Camcorder External Extension Lens – Video camera (or equivalent)	1	For site use
Nikon D5500 camera(or equivalent)	2	For site photography

Kyocera KM-4050 photocopy machine(or equivalent)	1	For office use
Blue ray disc writer	2	For office use
Laptop or PC Computer - specifications: HP 290 G2 8th Generation Core i7 8GB RAM, 2TB Disk, 2GB NVIDIA Graphics Card fully loaded with Windows 18 Pro, Office 2018 Pro and Internet Security Software(or equivalent)	3	for office use

The Personal Computers, Laptop/pc, camera and Photocopying Machine shall revert to the Employer at the end of the Contract.

Importation, possession and use of irradiating devices
Where required, the Contractor shall provide a nuclear gauge for the Engineer's laboratory. He shall follow the procedures for the procurement and deployment of the equipment in accordance with the Ministry of Health Regulatory Process for Setting up a Radiation Facility and arrange to obtain the necessary licences and permits, as required by the Radiation Protection Board in compliance with the Radiation Act, Cap 243 of the Laws of Kenya. The Approval for importation must be sought before the device is brought into the country. The storage facility shall be approved by the Radiation Protection Board and the Ministry of Transport and Infrastructure, Materials and Research Department.

Before handling the equipment, all staff to be deployed on the use of the gauge shall be trained, assessed and approved by the Radiation Protection Board and the Ministry of Transport & Infrastructure, Materials and Research Department. Exemptions shall be granted only to persons with proof of previous training by the said institutions. They shall also undergo medical examinations at a medical facility approved by the Board before deployment. The Contractor shall arrange for purchase of radiation badges and monitoring radiation levels every month by the Ministry of Health or an Agent approved by the Radiation Protection Board.

The cost of the medical examinations and monitoring radiation for the Engineer's laboratory staff shall be paid by the Contractor and reimbursed under the BOQ upon production of the receipts. However, the Contractor shall include the cost of obtaining the licences, permits and annual renewal thereof, construction of the storage facility and the transportation cage in his rate for provision of the equipment and no additional payment shall be made in the Contract.

The gauge shall revert to the Contractor on completion of the Contract

132.9 Wireless Communication for the Employer's representative

Radio communication equipment
The Contractor shall, if so instructed by the Engineer, provide, install, maintain and license as necessary a radio Communication network for the duration of the Contract and for the exclusive use of the Engineer. The Communication network shall be complete and shall consist of one fixed base radio station complete with all accessories and complete trans-receiver stations for each of the Engineer's staff cars, mobile office and laboratories. The equipment provided shall have a range adequate for mobile units and extreme ends of the site to communicate with each other and/or with the Central control. The model and make of the radio communication system shall be approved by the Engineer.

The Contractor shall be responsible for obtaining all necessary permits and licenses needed for the operation of the radio call services. The Contractor shall maintain the equipment in good working condition, including charging of batteries for the mobile units.

Failure by the contractor to provide or maintain the equipment shall make him responsible for 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 the works.

Ownership of the radio equipment shall revert to the contractor on completion of the Contract.

Payment for complying with this requirement is included in the Bill of Quantities.

Mobile phones

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 airtime for these mobile phones as directed by the **Employer's representative**
Details of the numbers of mobile phones to be provided are included in the Bill of Quantities.
Payment for complying with these requirements is also included in the Bill of Quantities.

133 Time for Erection of the Employer's representative Staff Houses, Offices/Laboratories

The time for completion of all housing for the Engineer's office, laboratory, senior and junior staff shall be as specified in the Standard Specification.

During the duration from the commencement of period of performance until taking over of the Engineer's houses and office the Contractor shall provide suitable hotel or rented accommodation and appropriately located temporary office space all adequately furnished and equipped to the approval of the Engineer. The contractor shall be deemed to have allowed in his rates for the temporary accommodation of the Resident Engineer, Materials Engineer, Senior Surveyor and three support staff during this mobilization period and no separate payment will be made.

137 Attendance upon the Employer's representative and His staff

Further to the provisions of Clause 137 of the Standard Specification, the Engineer may instruct the Contractor to provide the staff for attendance to the Resident Engineer in accordance with the following Sub-Clauses:

137.1 Staff employed and paid by the Contractor for attendance upon the Employer's representative

The Engineer may instruct employment of staff listed below by the Contractor for attendance upon the Resident Engineer. The Contractor shall provide housing as described under Clause 132 of this Specification and pay the salaries, allowances and benefits as determined by the Engineer and claim reimbursement under the BOQ. These shall be subject to the statutory deductions, namely PAYE, NSSF, SHA and Housing Levy which the Contractor shall remit to the relevant authorities every month with copy of each remittance being submitted to the Engineer for his records.

4 № Assistant Engineer

4 № Inspector of Works

2 № Laboratory technologists

4 № Laboratory technician

4 № Assistant Laboratory technician

2 № Draftsman

2 No. Survey assistant

2 № Secretary

6 № Chainmen

7 № General Attendants

The Engineer shall interview, select and recommend for employment all the positions listed above. Upon employment, the Contractor shall provide each with an Employment Contract in accordance with the Employment Act, 2007 or the latest amendment of the Act, stating therein the conditions of employment. At the end of the Contract Period or termination of services, whichever comes earlier, each employee shall be issued with a Certificate of Service as provided for in the foregoing Act. Use of documents drafted by the Engineer shall not relieve the Contractor of his duties and obligations under this Clause.

138 Provision of vehicles

In addition to provisions of the Clause 138 of the Standard Specification, the Contractor shall, when instructed, provide and maintain in good working condition for the exclusive use of the Engineer and his staff throughout the Contract, the following types and numbers of brand new vehicles. The Engineer shall approve the type of vehicles and confirm the number of each type to be provided. The Contractor shall insure the vehicles comprehensively for any licensed drivers and shall provide competent drivers during normal working hours and whenever required by the Engineer. The cost of provision of the vehicle shall be inclusive of the first 4,000 kilometres travelled in any month.

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

Double Cabin and single cabin pick up Vehicles should be four Wheel Drive (4WD), with power assisted steering, Double wishbone independent suspension at front axle and rigid axle with leaf springs at rear and diesel propelled engine minimum capacity 2,500 cc. The vehicles should be fitted with other accessories below:
Spare tyre and wheel jack;

FM radio and CD player;

Power Windows;

Full Air-conditioning;

Immobilizer and antitheft security system and tracking device;

Driver and passenger SRS Airbags;

Canvas cover over the carrying deck at the back.

The Contractor shall supply new vehicles and maintain them for the exclusive use of the Engineer and his staff, for any purpose whatsoever authorised by the Engineer.

All vehicles to be supplied will be brand new, right hand drive and fitted with airbags, air-conditioner and power steering as described below.

Type 1: Two (2): Minimum 2.8 litre 4-wheel drive, 5 door utility vehicles, or similar approved station wagon.

Type 2: Eight (8) No: Minimum 2.5-litre turbo charged diesel 4-wheel drive, or similar approved twin-cab pick-up.

Type 3: One (1) No: Minimum 2.5 litre 4-wheel drive, single cabins or similar approved.

Type 4: One (1) No: Minimum 4.0 litre 33-seater minibus or similar approved.

Ownership of the vehicles supplied to the Engineer shall revert to the Contractor upon completion of construction.

2No. Type 1 and 2no. Type 2 vehicles will be supplied and maintained throughout the 12 months Defects Liability Period. Payment will be made as for the vehicles to be supplied during the construction period. Ownership of these vehicles will revert to the Contractor at the end of the Defects Liability Period.

139 Miscellaneous Accounts

The Contractor maybe 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.

140 Payment of Overtime for Engineer's Junior Staff

In addition to the support staff provided by the contractor, the following shall also constitute part of the Engineer's junior staff:

4 № Assistant Engineer

4 № Inspector of Works

4 № Laboratory technologist

2 № Laboratory technician

4 № Assistant Laboratory technician

2 № Draftsman

2 No. Survey assistant

2 № Secretary

6 № Chainmen

7 № General Attendants

If the Contractor wishes to execute the works on regular basis outside the Engineer's normal working hours as given in Clause 108, over a prolonged period, the Engineer may if he deems it necessary, employ additional supervisory staff for which the required salaries shall be catered for in full by the contractor at his own cost through the Engineer's office. In addition, the Contractor shall provide the required accommodation for such staff at his own cost. The Contractor shall not be reimbursed any of this cost.

141 Measurement and Payment

Item: Mobile Telephones

The provision of mobile phones units for the Engineer shall be measured and paid for by the number. The rate entered in the Bill of Quantities shall include for the costs of providing the mobile units complete with charger unit, a "hands free" headset, connection to the network and all service charges applicable.

Add the Following clauses:

142 Liquidated Damages

Liquidated Damages at the rate indicated in the Appendix to Form of Bid shall apply in the event of the work not being completed within the time for completion plus any extension of time which may be determined by the Engineer. The limit of liquidated damages shall be as indicated in the Appendix to Form of Bid.

143 Protection of the Environment

Further to the requirements of Sub-clause 19.1 of the Conditions of Contract, the Contractor shall be responsible for the following measures to protect the environment.

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.

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

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 disposal.

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.

The Contractor shall be responsible for the provision of adequate sanitary facilities for his workforce, and that of his subcontractors at all construction and ancillary sites. The Contractor shall not allow the discharge of any untreated sanitary waste to ground water or any water of ground surface watercourse.

All concrete and asphalt plants shall be operated and maintained in accordance with the original manufacturers specifications and manuals, and in such a manner as to minimize emissions of hydro-carbons and particulate if in the opinion of the Engineer the operation of such plant is causing or is likely to cause nuisance or health problems to the 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.

The Contractor shall regularly spray with water all exposed dirt surfaces to reduce dust levels.

The Contractor shall take all responsible measures, at all sites under his control to prevent spillage and leakage of material likely to cause pollution of water resources. Such measures shall include but not be limited to the provisions 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.

The Contractor shall be responsible for ensuring that exposed surfaces are re-vegetated as construction progresses all to the satisfaction of the Engineer.

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 replace it with an approved tree at no additional cost to the Employer.

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 locally to parts of the works which constitutes particular fire hazards.

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 costs of complying with the requirements of this clause.

144 Off Road Environmental Measures

In addition to the provisions of Clause 142 above and all other requirements of the Conditions of Contract, Standard and Special Specifications, the Employer and the National Environmental Management Authority (NEMA) may order certain environmental measures to be carried out which are off the road and not specifically covered under these provisions. The Contractor shall carry out such works with equipment, labour and plant provided under the Contract or shall make such arrangements for specialized works to be carried out by a specialized subcontractor.

The Contractor shall be paid for all direct expenses under a provisional Sum in the Bill of Quantities and a percentage (%) for his handling costs and profits.

145 Staff Training

The Contractor shall allow for training of engineers, technicians and other support staff as may be instructed by the Engineer.

The payment of the allowances of such staff shall be made as instructed by the Engineer under the relevant item of the Bills of Quantities.

200 MATERIALS AND TESTING OF MATERIALS

205 Soils and Gravels

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.

After four days soaking in the case of virgin materials, and

After seven days curing plus seven days soaking in the case of cement/lime improved materials.

211 Bituminous Binders

Requirements

Straight run bitumen

The ash content of penetration grade bitumen shall not exceed 0.5% by weight.

300 SETTING OUT AND TOLERANCES

301 Setting Out

General

If traverse points to be used for setting out are close to the existing carriageway and interfere with the construction works, the Contractor shall relocate them to a location where they will not be disturbed. The coordinates and heights of all transverse points so relocated shall be listed and provided to the Engineer for checking and/or approval. The Contractor shall also reference with monuments the new road centrelines every 200 m long straight sections and at all salient points along curves, consisting of a pin in a concrete beacon, before commencement of any works.

The roads reserve boundary posts shall have 12 mm diameter steel pins, 200 mm long embedded in concrete with 25 mm exposed and sticking from the top surface. This pin shall be coordinated and heightened and details of the same shall be provided to the Engineer for approval.

Detailed setting out

Reference pegs shall be 50 mm x 50 mm in cross section, 600 mm long driven 400 mm firmly into the ground and painted white above ground level. The offset from the centreline shall be indicated by a small nail, 20-25 mm long, with its head driven flush with the top of the peg. Chainages, chainage offsets and reference elevation shall be clearly marked on the sides of the peg to the satisfaction of the Engineer.

400 SITE CLEARANCE AND TOP SOIL STRIPPING

401 Site Clearance

Add the following as the last paragraph of Sub-clause (a).

Site clearance is not required over the paved width of the existing road and shoulders. No measurements and payment for site clearance will be made for this width. The remaining area within the road reserve including the sides of the existing embankments and cutting should be cleared as instructed by the Engineer. This operation shall also include the removal of selected 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 assistance of the Contractor shall mark out the trees to be removed. After removal the trunk and branches of these trees shall be cut into pieces not more than 2.0 m in length, transported and neatly stored at the nearest Ministry of Roads camp at a position to be indicated by the Engineer. Payment for this work shall be as detailed in the Bill of Quantities. The rate inserted by the Contractor for this work shall include the cost of complying with all the requirements of this clause.

500 EARTHWORKS

502 General
Renumber the existing text as 502.1 and add the following Sub-clause 502.2 to this clause:

502.2 Definitions for Earthworks
Formation level is defined as the lower (bottom) level of sub-base. Sub-grade is the material within 300 mm or such other thickness as may be shown on the drawings, below the formation level. Earthworks are defined as the works below the sub-grade level.

504 Preparation Prior to Forming Embankments
Renumber the existing text as 504.1 and add Sub-clauses 504.2 and 504.3 as follows;

504.2 Benching
Where shown on the drawings or instructed by the Engineer, the Contractor shall, where fill is required, excavate benches where the ground to receive the fill has a slope greater than 1 (vertical): 5 (horizontal).

Where benching is required, the existing ground, after removal of top soil in accordance with the requirements of Section 4 of the Specification, shall be benched by cutting steps such that the horizontal width between the cut face of the bench and the instructed final embankment slope is not less than 1.5 m .Each slope shall be graded to a slope of 1 in 40 from the centreline of the road so as to avoid the pounding of water. The minimum width of 1.5 m shall generally be required for each bench and the Contractor shall allow working in narrow widths.

All earthworks in widening shall be compacted to 100% MDD (AASHTO T99).

The volume of material cut from benches and its re-utilization shall not be measured for payment but is deemed to be included in the Contractor’s rates for earthworks.

504.3 Ground Compaction
After top soil stripping in accordance with Section 4 of the Specification and benching in accordance with Clause 504 of the Specification, the existing ground, including benches, under embankments shall be compacted to a dry density of at least 95% MDD (AASHTO T99) to a depth of 150 mm below ground level unless otherwise directed by the Engineer. Compaction of benches other than the first bench will not be separately measured and is deemed to be included in the Contractor’s rates for earthworks.

505 Construction of Embankments
Only material approved by the Engineer shall be used in embankments. Material with high swelling characteristics or high organic matter content and other undesirable material shall not be used, unless specifically authorized by the Engineer. Unsuitable material shall include:

Material containing more than 5% by weight of organic matter, such as topsoil, humus, material from swamps, mud, log stumps and perishable material with a swell of more than 3% Clay with a liquid limit exceeding 50%.

Material having moisture content greater than 105% of optimum moisture content (standard compaction) in its naturally occurring state.

Material for sub-grade shall meet the following requirements:

CBR of not less than 14% measured after 4 day soak on a laboratory mix compacted to a dry density of 100% MDD (T99) Swell less than 1% on the laboratory mix sample.

Maximum dry Density (MDD) not less than 1500 kg/m2.

Rename the existing text of the Standard Specification as 507.1 and add the following to this clause:

507.2 Rock fill in embankment and behind structures

Scope of Application

With the approval of the Engineer, the rock fill Material can be used only in the following circumstances:

Where the height of embankment is more than 3 m, including formation level, the lowest 1.0 m thickness can be constructed using rock fill.

For all heights, the sloped portion beyond shoulder can be constructed using rock fill with provision that, under all circumstances, a minimum of 500 mm thick earthen cushion shall be available between formation level and top level of rock fill.

Behind the structures irrespective of the height of embankment up to the bottom of sub-grade.

Material

The maximum size of stones shall not exceed 300 mm in any direction. The voids between rocks shall be filled by smaller rock fragments.

Spreading and Compaction

The method of compaction as specified under Clause 507.1 of the Standard Specification and/or as directed by the Engineer, should ensure that no boulders are loosely packed and can move or rock after compaction. The top layer as well as the sides of the retaining normal earth fill on one side shall be fully blinded with filter media comprising crushed aggregate and sand. The grading and layering of filter media shall be such as to form effective filter layer through which particles of inner soil fill of embankment are not able to migrate into the rock fill layer in the process of settlement/consolidation or due to movement of water. The layer work shall combine with the layers of the adjacent rock fill so as to facilitate simultaneous compaction.

Rates

The rates are applicable to completed construction as measured by taking levels before and after compaction up to the top of blinding/filter media 300 mm thick and are inclusive of all materials, void filling materials, blinding materials and filter media.

The preload material shall be removed from any stage of the construction when, in the opinion of the Engineer, based on settlement monitoring records, the required primary consolidation of the soft silts has been achieved.

Based on consolidation properties of soil, expected preload time shall be estimated for each stage. However, this time can be influenced, not only by settlement, but also by the rains. The Contractor will not be entitled to extra payment should these times be varied due to the site conditions or the rains.

Settlement Monitoring

Continuous monitoring of settlement will be necessary to check the efficiency of the system. The instruments for monitoring settlement and stability shall include settlement platforms, Piezometers to determine if pore pressures are exceeding limits that might endanger stability, and Inclinometers to determine if lateral movement occurs.

Settlement monitoring devices shall be installed at the Contractor's cost to monitor the settlement behaviour of ground under fill, to establish the effectiveness of the drainage system. The Contractor shall carry out the settlement monitoring works, including the installation of all the required equipment, in accordance with Standard Specification.

508 Compaction of Earthworks

Fill above ground level adjacent to pipe culverts shall be compacted in layers not exceeding 150 mm in thickness to a field density of 100% MDD (AASHTO T99) up to the level of the top of the pipes or top of surround. The compaction shall extend for a width equal to the internal diameter of the pipe on either side of the pipe (s) or surround (s).

Adjacent to the structures, all fill above ground level up to the underside of the sub-grade shall be

compacted in layers not exceeding 150 mm in thickness to a field density of 100% MDD (AASHTO T99). In case of fill around box culverts, this shall be carried out for the full width of the fill and for a length bounded by the vertical plane passing through the ends of wing walls.

Where the formation in cut areas is formed of hard material, the Contractor shall remove the hard material to a depth of 200 mm or such other depth as may be directed by the Engineer. The void so formed shall be backfilled with sub-grade quality material and compacted to the same standard and tolerances as for sub-grade in fill.

Improved sub-grade, where required as part of the embankment construction shall be compacted and finished to the same standards and tolerances as those required for normal sub-grade.

509 Mass Haul Diagram
No mass haul diagram has been provided with the Contract documents. The Contractor shall locate suitable materials for constructing earthworks along the alignment and elsewhere.

511 Borrow Pits
Delete the first paragraph and substitute with the following;

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.

514 Top Soiling and Grassing
Consider the existing text to be Sub-clause 514.1

The embankments and cut faces referred to in Clause 514.1 of the Standard Specification are synonymous with fill slopes and cut slopes defined in Clause 110

(c) of the same specification.

The guiding dams referred to in Clause 514.1 of the Standard Specification are synonymous with the guiding dams referred to in Clause 817 of the same specification.

Add the following Sub-clause 514.2

514.2 Hydro-seeding
Where it is specified that hydro-seeding should be carried out on topsoil, the thickness of the topsoil shall be 100 mm unless, where suitable soil is present, the Engineer orders the topsoil to be omitted or applied in reduced thickness.

The Engineer and the Contractor shall agree the types and mixtures of seeds to be used on before the Contractor orders any seed he may wish to use. The variety of resulting grass or plants should not be attractive to livestock or grass eating animals.

The Contractor shall be solely responsible for establishing an acceptable grass cover and any approval by the Engineer of seed or seed mixtures intended for use by the Contractor shall not relieve him of this responsibility. All areas to be hydro-seeded or hand seeded shall be scarified forming horizontal drills running parallel to the contours. The drills are to be spaced at intervals of 150 to 250 mm apart. Seeding to Mulch shall be added to the hydro-seeding mix at an approved rate.

Hydro-seeding shall be carried out with an approved hydro-seeding machine at a rate of application of not less than 20 gm/m2 for fill and cut slopes and 10 gm/m2 for other areas. When the use of anti-erosion compounds is required and such compound is to be applied simultaneously with the hydro-seeding, it shall be mixed with the hydro-seeding mixture before application.

514.3 Application of Chemical Fertilizers
For all areas to be grassed the Contractor shall have the top 150 mm of the prepared surface analyzed to determine the quantity and type of fertilizer that may be required for establishing proper growth conditions for the grass. The locations of soil samples taken shall be indicated on plans by the Contractor. The Contractor shall furnish the Engineer with the soil analysis and subsequent fertilizer recommendations. Only after approval by the Engineer of the nature and quantity of fertilizer may the application proceed.

Soil improvement chemicals and fertilizers shall be made available for application of chemical fertilizer. As such no separate reimbursement to the Contractor shall be made. The Contractor shall be deemed to have included his costs in the rates for top soiling and grassing.

515 Side drains
Whenever excavation works inside drains constitutes a separate operation from the bulk earthworks such excavations shall be classified as catch water drains under Section 8 of the Specification.

517 Measurement and payment

Fill in soft material
Add the following at the end of this item:

Quantities for embankment widening shall be measured using the final compacted volume of filled material over the existing embankment after removal of top soil. No separate 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 504.2 of this specification with respect to benching where necessary. The Contractor shall take this into consideration when preparing his rates.

Spoil in soft material
Add the following at the end of this Item:

The rate for spoil in soft material shall also allow for removal and disposal of material in waterlogged areas. No separate payment shall be made for overhaul.

Add the following:

Item: Providing an approved seed mixture for hydro-seeding Unit: Kilogramme (kg)
The Unit of measurement shall be the kilogramme of seed of the specified or approved seed mixture provided. The rate shall include the full compensation for procuring and furnishing certified seeds and compliance with Clause 514.2 of this specification.

Item: Hydro-seeding Unit: Hectare (ha)
The unit of measurement for hydro-seeding shall be the area, measured in hectares of grass established by hydro-seeding which has an acceptable cover. The rate shall include full rate for furnishing cellulose pulp, mixing it with seed, water and with any anti-erosion compound, if required, applying the mixture, watering weeding, reseeding bare patches, and for any other work which may be necessary for establishing an acceptable cover and maintaining the grass.

Add the following to this section. The details apply to both the activities for the quarries and road works.

518 Blasting

518.1 Control Blasting

The rock blasting shall be controlled so that vibration generated during the blasting do not cause damage to the building and installation around built up areas as given in the table below. Similarly, the rock pieces should not fly off the pits and thus damage the buildings, installation, life and limb of people around. Apart from the general precautions mentioned in the Standard Specification, the protective measures and limits, stated under Clause 518.2 below for use of explosives are suggested as guidelines. The Contractor shall carefully check the site conditions and submit to the Engineer the details of the scheme he proposes to adopt for controlling the blast.

518.2 Protective Measures

The following precautionary measures, single or in combination, as required by site conditions shall be adopted by the Contractor while carrying out controlled blasting.

Short delay blasting with light charges shall be used.

The blast hole shall be covered with 0.6 m2 to 1.0 m2 mild steel plate of minimum 6 mm thickness.

Reinforcement rod mesh not less than 20 mm dia. at 150 mm centres in both directions shall be placed over the steel plates. Steel plate and reinforcements shall be inspected after every blasting operation and all twists shall be removed before reuse to the satisfaction of the Engineer.

The thickness of the covering plate and the kind of dead weight is to be duly approved by the Engineer.

When blasting is necessary adjacent to partially or completely built structures the Contractor shall take all precautions necessary to prevent flying rock from causing damage to the structures.

518.3 Blasting Within Certain Limit
No blasting shall be allowed for any of the excavation until freshly placed concrete of nearby structures has reached a minimum strength of 7 N/m2.

Normally blasting shall be resorted to only after 7 days of concreting work in case of OPC (10 days in case of PPC) in adjacent structures.

In no case shall blasting be allowed closer than 15 m to any structure after concrete placing has started.

The Contractor shall submit the scheme with charges and delay detonators he proposes to use for blasting for the approval of the Engineer.

Permissible Standards
Depending on the type of structures and the dominant excitation frequency, the permissible peak particle velocity (ppv) due to blast induced ground vibrations adjacent to the structures shall not exceed the values given in the table below.

Permissible Peak Particle Velocity (PPV) at the Foundation Level of Structures in Blasting Areas in mm/s

Type of Structure		Frequency Hz.		
		PPV (mm/sec)		
(a)	Buildings/Structures not belong to the owner:			
(i)	Domestic houses / Structures (temporary, Brick and Cement)		5	
(ii)	Industrial Buildings (RCC and Framed Structures)		10	
(iii)	Objects of historical importance and sensitive structures		2	
(b)	Buildings belonging to owner with limited span of life:			
(i)	Domestic houses/structures (Temporary, brick and Cement Mortar)		10	
(ii)	Industrial building (RCC and framed structures)		6	

It is generally recommended that where the blasting is to be carried out, within 20 metres of the nearest point of permanent building, the area shall be line drilled on periphery before blasting.

The Contractor shall be responsible for all damage caused by blasting whether to permanent or temporary structures and shall replace or repair the structures at his own cost. The Contractor will have to design the charge per delay to restrict the PPV as indicated above.

518.4 Precautions after Blasting
After the blast, the Contractor's works superintendent must carefully inspect the work and satisfy himself that all the charges have disappeared from the face.

If it is suspected that part of the blast has failed to fire or is delayed, sufficient time shall be allowed to elapse before entering the danger zone. When fuse and blasting caps are used, a safe time should be allowed and then the superintendent alone shall leave the shelter to inspect the blasting zone.

None of the drillers is to work near the misfired hole until one of the two following operations has been carried out by the superintendent:

The supervisor should very carefully, when the tamping is of damp clay, extract the tamping with a

wooden scraper or jet of water or compressed air, using a pipe of soft material, and withdraw the fuse with the primer and a fresh detonator with fuse should be placed in these holes and fired out, or

The hole may be cleared or 30m of tamping and its direction then be ascertained by placing a stick in the hole. Another hole may then be drilled at least 60o mm away and parallel to it and about 300 mm less in depth. This hole shall then be charged and fired. The balance of the cartridges and detonators found in the muck shall be removed.

Before leaving his work, the superintendent of the concluding shift shall inform the superintendent of the relieving shift of any case of misfires and should point out the position with a red cross denoting the same and also stating what action, if any, he has taken in the matter.

The superintendent should also at once report at the office of the Contractor and the Engineer all cases of misfire, the cause of the same and what steps were taken in connection with these.

The names of the day and night shift superintendents must be noted daily in the Contractors office.

If a misfire has been found to be due to a defective detonator or dynamite the whole quantity or box from which the defective article was taken, must be thoroughly inspected by the Contractor.

Drilling in holes not completely exploded by blasting shall not be permitted.

518.5 Personnel

Excavation by blasting will be permitted only under the personal supervision of competent and licensed blasters and trained workmen.

All superintendents and workmen in-charge of preparation, handling storage and blasting work shall be adequately insured by the Contractor.

Storage shall be under a very reliable person approved by the Engineer, who may, if necessary conduct police enquiries as to his reliability and antecedents. The Contractor shall have to produce a security for the person in-charge of the explosive, if and when required by the Engineer, or the civil authorities of the project road location.

The Contractor shall make sure that his superintendents and workmen are fully conversant with all the rules to be observed in storing, handling and use of the explosives. It shall be imperative that the superintendent in charge is thoroughly acquainted with the details of the handling of explosive and blasting operations.

518.6 Rate of Charge

To establish the safe charge per delay the Contractor will have to demonstrate by necessary instrumentation for the approval of the Engineer.

600 QUARRIES, BORROW PITS, STOCKPILE AND SPOIL AREAS

601 General

The Employer will not make available to the Contractor any land for quarries, borrow pits, stockpile and spoil areas, except for those in the road reserves and specifically approved by the Engineer.

The Contractor will be entirely responsible for locating and providing suitable sources of materials complying with the specifications and for procurement, winning, haulage to site of these materials, rehabilitating the borrow pits, quarries, stockpile and spoil areas, and all costs involved therein. Similarly, the Contractor will be responsible for provision of areas for stock piling materials and disposal of spoil dumps or stockpiling within the road reserve. The Contractor may utilize them subject to the approval of the Engineer.

No additional payment will be made to the Contractor to cover costs arising from the requirement of this clause. The Contractor shall include the costs of complying with this clause in the rates and prices inserted elsewhere in the Bill Of Quantities.

602 Definitions

Add the following to Clause 602:

Materials Report

The information on possible material sites is given for the general guidance of bidders.

However, bidders are advised to conduct their own investigation as the information contained therein is neither guaranteed nor warranted.

700 EXCAVATION AND FILLING FOR STRUCTURES

703 Excavation of foundations for structures
Make amendments to this clause as follows

Read the second paragraph as “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 100% MDD (AASHTO T.99) immediately before structures are constructed.

Paragraph 4, last line: - Replace "95%" with "100%".

Add the following to this clause:

703.1 Preparation of Foundation and Approval

Preparation of Foundation
The bottom of foundations shall be levelled both longitudinally and transversely or stepped as directed by the Engineer. Where the material met with is other than rock, the same shall be compacted to at least 95% MDD. Where rock and soil are met with in part widths, the area in the soil portion shall be sub-excavated to a depth of 100 mm and backfilled with Class 15/20 concrete. All rock faces shall be freed of soft and loose material, cleared and cut to a firm surface, level, stepped or serrated as directed by the Engineer. All seams shall be cleared out and filled with cement mortar, to the satisfaction of the Engineer.

Approval of Foundation

After excavation in each location is completed, the Contractor shall notify the Engineer, and no foundation concrete shall be placed until the Engineer has approved the depth of the excavation and the character of the foundation material.

703a Erosion Protection Works at Upstream and Downstream of Culverts/Bridges

703a.1 Scope
The work shall consist of provision of erosion protection works in the form of bed flooring and curtain or cut-off walls at the upstream and downstream ends of the new as well as the existing box/pipe culverts. The work shall be carried out to such designs and at such locations as indicated on the Drawings or as directed by the Engineer.

The erosion protection works shall consist of dry rubble stone bed flooring and random rubble masonry curtain (cut-off) wall at the upstream and downstream ends of box/pipe culverts.

703a.2 Materials
The material for bed flooring shall be dry rubble stone, each stone weighing not less than 40 kg.

The curtain wall shall be constructed of random rubble masonry in cement mortar of 1:3.

703a.3 Construction Operations

Curtain Wall

The trench for the curtain wall shall be excavated as per Clause 703 of the Standard Specification at such locations and to such depths shown on the Drawings or as directed by the Engineer. After preparing the foundation bed, the curtain wall shall be constructed to the thickness shown on the Drawings and to levels up to top of the bed flooring.

Floor Paving

The bed for the flooring shall be prepared by excavation in accordance with Clause 703 of the Standard Specification or filling in accordance with Clause 707 of the same specification, levelled and compacted to at least 98% MDD. The top of bed shall be prepared to such levels that after construction of the bed flooring, it is in line with the invert of the culvert barrel and sloping away. The bed flooring shall end before the curtain wall.

707 Backfilling of Excavations and Filling for structures
Make amendments to this clause as follows

Delete “95% where ever it appears and insert “100%”.

708 Protection of Structures
Add the following to Clause 708.

Unless specific provisions for any structure in respect of cofferdams has been made in the Bill of Quantities, no payment will be made for the erection, maintenance and removal of cofferdams and the Contractor’s rates shall be deemed to be all inclusive.

709 Excavations for River Training and New Watercourses
Add the following to Clause 709:

For culvert widening the Contractor shall inspect the structures to be widened and allow for any river training works he deems necessary in his rates for excavation.

710 Stone Pitching
Add the following to Clause 710:

Stone pitching to drains, inlets and outlets of culverts to embankments and around structures shall consist of sound un-weathered rock approved by the Engineer.

All stone for pitching shall be capable of withstanding a crushing stress of 20 N/mm² when soaked. The source of stone shall be free from overburden, mudstone, cracks, sand holes, veins, laminations or other imperfections as may be identified by the Engineer during the approval process.

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.

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 Specification. The Works shall involve removal of the damaged stone pitching and reconstruction of the said areas in accordance with Clause 710 of the Standard Specification by the use of the sound salvaged material together with any necessary additional material where all such materials shall comply with Section 7 of the Standard Specification

800 CULVERT AND DRAINAGE WORKS

804 Excavation for Culverts and Drainage Works

In the Standard Specification make the following amendments on this clause:

In paragraph 6, line 3, in paragraph 7, line 5 and in paragraph 11, line 6, delete reference to “95%” and insert “100%”.

805 Excavation in Hard Material

In the Standard Specification, sub-clause 805 (a) and (b) delete reference to “95%” and insert “100%”.

809 Bedding and Laying of Pipe Culverts

In the Standard Specification, sub-clause 809 (a), delete reference to “95%” and insert “100%”.

Add the following to Clause 809:

Laying, Bedding and Surround for Culverts Cast In-situ

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

All concrete used for surround and the top 50 mm or 80 mm of bedding for culverts size 600 mm and 900 mm internal diameters respectively shall be Class 25/20 while the rest of the concrete shall be class 20/20.

The inner concrete barrel surface immediately in contact with the inflated balloon form during placing shall achieve Class F3 finish.

810 Jointing Concrete Pipes

In addition to the requirement of Clause 810 of the Standard Specification, all precast concrete pipes shall be ogee jointed pipes laid with a 1:2 (cement: sand) mortar and provided with fillets on the outside and as described in the Standard Specification.

812 Backfill

In the Standard Specification make the following amendments to this clause:

Wherever the expression “dry density of 95% (AASHTO T99)” occurs, this expression shall be deleted and replaced with “dry density of 100% (AASHTO T99)”.

Delete paragraph 6: “For pipes culverts…depth of 150 mm”, entirely.

816 Minor Drainage Structures

Add the following to this clause:

Concrete Lined Drains

The exposed surfaces of concrete lined drains shall be a class UF2 finish. Concrete lined drains shall be constructed to the same standard as the minor drainage structures.

Cast in situ chutes on side slopes

Where pre cast chutes are provided, refer to Section 1 of this the specifications.

817 Mitre Drains, Cut-off Drains, Catch Water/Drains, Outfall Drains and Earth Dams

Rename the existing text as 817.1 and add the following sub-clauses:

817.2 Cleaning Existing Drains

Where instructed by the Engineer, the Contractor shall clear blocked side drains and/or outfall drains to a free flowing condition. The work shall consist of but not be limited to:

Stripping and removal of extraneous material including vegetation and roots to spoil

Carting away and spreading any spoil to the satisfaction of the Engineer, and

Reshaping the drains to a free flowing profile.

817.3 Cleaning of Hydraulic Structures

Where instructed by the Engineer, the Contractor shall clean the existing hydraulic structures by removing all undesirable material in the structures to ensure they are clean and free flowing. The Contractor shall dispose of all the silt and other undesirable material to spoil. After the cleaning out of structures, the Contractor shall be responsible for maintaining the hydraulic structures in a clean condition for the duration of the Contract.

817.4 Removal of Existing Pipes, Inlet and Outlet Structures

The Contractor shall remove existing concrete pipes where instructed by the Engineer including bedding, surround, inlet and outlet structures. Concrete shall be disposed of as directed by the Engineer. Masonry structures where in a good condition shall be preserved to reuse as may be directed by the Engineer. Additional material shall be added to the void left after removal of these pipes and structures and shall be carefully compacted to 100% MDD (T99). The void shall then be preserved for placement of any new pipes or construction of new structures.

The existing inlet and outlets structures, where in good condition, and reusable as beds to pipe extensions, shall not be removed. Any such structures removed without the Engineer's approval shall be restored to the original condition at the Contractor's expense.

817.5 Extension of Existing Pipes

Where shown on the drawings or instructed by the Engineer, the Contractor shall extend the existing concrete pipes. Part of the existing pipe surround shall be broken and concrete collar constructed as shown on the drawings. The extension shall be backfilled to the same standards as for new pipes.

817.6 Chute drain for High Embankment Sections

Scope

This work shall consist of construction of chute drain on the slope of the road embankment including erosion protection works at the locations and to dimensions shown on the Drawings or as directed by Engineer. The schedule of works shall be so arranged that the drains are completed in proper sequence with roadway to ensure that no damage is caused due to lack of drainage.

Materials

The drains shall be of half round pipe of 600 mm dia. formed by joining pre-cast semi-circular RCC sections at site as shown in the drawings. The RCC work shall conform to the relevant clauses of these specifications.

The toe wall below ground level shall be of brick masonry in cement mortar 1:4 or plain cement concrete of class 15/20, as shown on the Drawings.

Dumped riprap for erosion protection at ground level shall be hard, unweathered and durable rubble stone of size 150 mm to 250 mm.

Construction Operations

Excavation for fixing drain sections at the locations where the chute drains are to be installed, a semi-circular cut on the side slope of the embankment along the line of the chute drain shall be made in such a way that the RCC drain sections could be fixed snugly with their edges flush with the adjoining embankment slope. The sloping bed of the drain shall be to a regular line and suitably compacted to provide a firm bed.

817.7 Stone Masonry and Concrete Paving

Description
The work shall consist of construction of lined ditches, stone paved shoulders, hard strips, chutes, toe walls, retaining walls, slab culvert walls, head walls, wing walls, aprons and slope protection works using natural stones for stone related masonry and precast concrete blocks for concrete block masonry set in cement mortar.

Materials
Stones

Stones used shall be hard and durable without weak seams or cracks and of rectangular shape. The Los Angeles Abrasion Value shall not exceed 50. The apparent specific gravity shall not be less than 2.2 and water absorption when tested in accordance with AASHTO T85 shall not exceed 5 percent.

Concrete Blocks
Concrete blocks for concrete block masonry shall be precast from Class 20/20 concrete while those used for paving shall be in Class 25/20 concrete. The blocks shall, in general, have the length, width and height in the proportion of 3:1.5:1 or as ordered by the Engineer. The blocks shall be moist cured for at least 7 days, and kept under cover for another 21 days in the casting bed before being lifted for use in the works. The blocks when tested flat after 28 days of casting shall have a compressive strength not less than 125 percent of the cylindrical compressive strength specified for the class of concrete used.

Mortar
The mortar shall be made of a mixture of cement and sand in the proportion of one cement to three sand. Cement shall be Portland cement conforming to AASHTO M85, Type I or II. The sand shall be crushed stone or natural sand or a combination thereof conforming to AASHTO M45. Water added shall be just adequate for making a workable mix and shall be subject to the approval of the Engineer.

Construction Requirements

Stone Masonry
The stone masonry shall be used for walls of different types above the ground level. The stones shall be of regular shape with length of any stone not exceeding 3 times its height, with the breadth on the bed not less than 150 mm nor greater than three quarters of the thickness of the wall. Unless otherwise directed, the stone shall have thickness not less than 150 mm.

All stone possessing bedding planes shall be laid with its natural bed as nearly as possible at right angles to the direction of the load, and in case of arch rings, the natural bed shall be radial.

Each course shall present a uniform horizontal line of more or less equal height. Vertical joints shall be broken by the adjoining courses. All joints shall be sufficiently thick to prevent stone to stone contact and shall be completely filled with mortar. On the exposed face no part of the masonry shall deviate from the general line of the wall by more than 20 mm.

Walls of stone masonry shall be provided with weep holes as shown on the Drawings or directed by the Engineer. In continuous long structures, expansion joints shall be formed as shown on the Drawings subject to a minimum spacing of 10 m.

All face joints shall be finished almost flush with the surface of the work without covering the stones. The top surface of all walls shall be provided with 20 mm thick cement mortar coping with a cross fall for shedding rainwater.

Newly laid masonry shall be protected against the harmful effects of weather and cured for a minimum period of 4 days. All visible surfaces of the masonry shall be clean and free from mortar stains and other blemishes.

Backfill behind the stone masonry walls shall be placed only after the masonry work has been in place

for at least 14 days or as directed by the Engineer.

Grouted Stone Riprap
This type of masonry that is constructed in a single layer over a bed of mortar shall be used for shoulder paving, hard strips, aprons, drainage chutes, lined ditches and slope protection. The stone shall be of regular shape and uniform thickness. Prior to laying of the stone, the base shall be brought to regular shape and levels, watered and well compacted. Where this type of masonry is to be used for paving shoulders or for carriageway widening of the existing roads, the base shall be slightly loosened, watered and compacted to 95% MDD prior to application of the riprap. The stone shall be placed over a bed of mortar about 20 mm thick. After placement of the stones by hand, all the joints shall be completely filled with cement mortar. The finished work shall present a uniform surface with no point deviating from the general line by more than 10 mm in the case of shoulder paving, and hard strips, and not more than 25 mm in other cases. The finished work shall be protected against the adverse effects of weather and cured for at least 4 days.

Dry Stone Riprap

This work shall consist of placing 150 mm to 300 mm size rubble stone on the front side of cut-off walls of culverts and Irish Crossings as erosion protection measure. The dimensions of the riprap construction shall be as shown on the drawings or as directed by the Engineer. The stone used shall be of hard and durable type as are used for stone/boulder masonry. The stone shall be so placed that major hollow spaces are avoided.

Measurement and Payment

Stone Masonry
The quantity to be paid will be measured by volume in m^3 of stone masonry complete in place and accepted. In computing the volume for payment, the dimensions used will be limited to those shown on the Drawings or ordered in writing by the Engineer.

No deductions will be made for weep holes, drainpipe or other openings of less than 0.2 m^2 in the area. The cement mortar coping on top of the wall shall be included in the measurement for stone masonry.

If the masonry is for heightening or lengthening an existing wall, the work of removing the plaster, if any, on the old wall including roughening of the surface to effect good bonding shall be considered incidental to the work and shall not be paid for separately.

The quantities of excavation below ground level and backfilling will be measured as structural excavation.

Grouted Stone and Dry Stone Riprap
Grouted Stone Riprap shall be measured by m^2 of completed and accepted work placed to the specific thickness. Measurement shall be limited to the dimensions shown on the Drawings or as otherwise authorised by the Engineer. No measurement shall be made of unauthorised areas or for extra thickness. Toe walls and cut-off walls below ground level shall be measured in m^3 and paid for as Boulder Masonry.

Where the rip-rap is used for shoulder paving or for widening carriageway of existing road, the bed preparation shall be measured as sub-grade preparation in accordance with Clause 508 of the Standard Specification. In all the other cases, slope and bed preparation shall not be measured for payment but will be considered subsidiary to the pay item.

Dry Stone Riprap shall be measured as placed in position in m^3. Any excavation for making space for placing the riprap shall be measured as common excavation in accordance to Clauses 504 and 505 of the Standard Specification.

Payment
The amount of completed and accepted work as measured will be paid for at the bid unit prices per m^3 for “Stone Masonry”, “Dry Stone Riprap” and “Grouted stone riprap”, used for shoulder paving, hard

strips, ditch lining, aprons, drainage chutes and slope paving. These prices shall be in full compensation for furnishing and placing all materials, and for all labour, equipment, tools and incidentals necessary for completion of the work complying with the specifications.

Add the following to Clause 819 of the Standard Specification:

819.1 Repair of Drainage Spouts
The repair of drainage spouts shall be made by cleaning of the existing drainage pipes of all muck and replacing the broken pipes or by providing new drainage spouts in cases where the same have not been provided.

Materials
Ordinary Portland cement 42.5 N KS 1825
Aggregates conforming to BS 5328
GI Pipes
Paint.

Equipment
Welding equipment
Painting brushes
Miscellaneous construction equipment

Procedure
The existing drainage spouts shall be cleaned of all muck. The new GI drainage spouts shall then be replaced for the damaged spouts as per the detailed drawings.

In case where drainage spouts have not been provided, the RCC kerb shall be cast after fixing new pipes as per the detailed drawings. The casting of concrete and fixing of pipes shall be made as per the standard practice.

The GI drainage spouts shall be painted with black anticorrosive paint of approved brand and manufacture to give an even shade.

The existing reinforcement shall be realigned and additional reinforcement shall be provided as per the drawings or as directed by the Engineer.

Concrete shall be mixed and laid as per the standard practice and as per the drawings. For bonding old concrete with the new concrete, the old concrete surface shall be painted with epoxy bonding agent or polymer cement slurry before the concreting is cast.

Item: Concrete for top 50 mm or 80 mm bedding and surround for culverts cast in situ.

Unit: m³
The rate for concrete for each size of culverts instructed shall include for the cubic metre of the top 50 mm or 80 mm of concrete for bedding and surrounds, as instructed, calculated from the dimensions on the drawings or as directed by the Engineer.

The rate for concrete for bedding and surrounds for culverts cast in situ shall include for the cost of providing and placing the concrete and complying with Clauses 809, 810, 814, 819 and 1713 of the Standard Specification.

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

Item: Cleaning and grading the existing outfall and metre drains

Unit: m³
Cleaning the existing drains shall be measured by the volume instructed. The volume shall be the product of the cross sectional area of the material to be removed from the drain and the length instructed.

Item: Removal of material from existing side drains

Unit: m³
Cleaning of the existing drains shall be measured by the volume instructed. The volume shall be the product of the cross sectional area of the drain to be cleaned and the length instructed. Payment will not be made under this item where the material can be removed in conjunction with bulk earthworks.

Item: Removal of the existing pipes

Unit: m³
Removal of the existing pipes shall be measured by the length of culvert removed. It shall include for breaking out where necessary and carting of the removed culvert and surrounds to spoil or stockpile as shall be directed by the Engineer. It shall also include all the costs of complying with the requirements of Clause 817.3.

Item: Demolition of inlet and outlet structures

Unit: m³ of concrete or masonry
Demolition of inlet and outlet structures shall be measured by the volume of concrete or of masonry structures demolished. There will be no distinction between reinforced and un-reinforced concrete structures. The rate shall include for disposal of concrete and reuse of masonry as directed by the Engineer. Stone pitching shall not be measured separately and where it is to be removed shall be treated as normal site clearance.

Item: Cleaning the existing hydraulic structures

Unit: m³

Cleaning of the existing hydraulic structures shall be measured by the volume of material removed. The rate shall include for the cost of removing all undesirable material, transporting and disposing off as well as the additional costs of gaining access to the structures as specified and maintaining the structures in a clean condition.

Item: Concrete collar Unit m³
Reinforced concrete collars shall be measured by the volume of concrete placed as shown on the drawings or instructed by the Engineer.

Where the existing culvert which is to be extended has a concrete surround, the rate shall also include for removal of this surround for the length of the collar to be placed around the existing culvert.

In all cases the rate shall also include for excavation below the culvert and the preparation and compaction of the in situ material to form a bed for the collar.

821 Cement Mortared Stone Masonry Walls

Masonry walling shall be constructed with sound clean stone with a minimum width of 200 mm. The stone shall have a fair finish. The stone shall be individually placed to break joint and to provide a minimum of voids. The stone shall be wetted and jointed in a 3:1 (sand: cement) mortar. Exposed stone on the wall faces shall be cleaned of mortar by washing or wire brushing. The mortar shall be flush pointed to the approval of the engineer.

Weep holes shall be provided as instructed and shall be cleaned of mortar and any other clogging material that may have entered during construction.

The walling shall be protected from the weather and kept moist for a minimum of seven (7) days after completion.

822 Subsoil Filter Drains

The Contractor shall lay subsoil filter drains where shown on the drawings or instructed by the Engineer. The drain shall extend to the underside of the sub-grade or sub-base and shall consist of a perforated pipe wrapped in geotextile fabric as specified in the Standard Specifications and shown on the drawings. The pipe and fabric shall be laid on and backfilled with granular filter materials. The granular material shall comply with the requirements given in the table below.

BS Sieve Size (mm)	Percentage by mass Passing Sieve	
	Minimum	Maximum
37.5	100	100
20	85	100
10	50	100
5	35	90
1.18	15	50
0.600	5	35
0.150	0	5

823 Gulley Pots and Chambers

Where shown on the drawings or instructed by the Engineer, the existing roadside gulleys and gulley pots shall be adjusted before laying final wearing course such that there are no depressions around man holes, gulleys or chambers. The beds, frames and haunches shall be adjusted with concrete Class 20/20 true to line and level and to the satisfaction of Engineer.

824 Pedestrian Crossings

Where shown on the drawings or instructed by the Engineer, the Contractor shall construct pedestrian crossings across open drains. The crossing will be 2.5 m wide, with culverts located as directed by the Engineer. The pedestrian crossing shall be finished to the same standards as the adjacent footpath. Where there is no footpath, the crossing shall be finished with approach path comprising 150 mm gravel base with surface dressing similar to the adjacent shoulder as directed by the Engineer.

825 Measurement and Payment for Further Additional Items

Item: Preparation of bed for concrete lined open drains

Unit: m^2

The unit of measurements shall be the square metre of excavation trimmed to receive concrete lining. The rate shall include for all the excavation below the finished line of the drain, providing and laying of gravel bed, and compacting and shaping to the line and level required to receive the concrete lining.

Item: Cast in situ concrete chutes

Unit: m^3

Cast in situ shall be read as “Pre-cast”. Pre Cast concrete chutes shall be measured by the volume of concrete cast. The rate shall include for preparation of sides, laying, fixing and for complying with the requirements of Sections 8 and 17 of the Standard Specification.

900 PASSAGE OF TRAFFIC

903 Maintenance of Existing Road
Amend as follows:

The Engineer shall hand over the existing road to the contractor, in sections, at the commencement of the Contract for construction purpose. However, the Contractor shall be responsible for all repairs and maintenance of the entire road package for the duration of the Contract. The existing road is bituminous and the Contractor shall maintain it with asphalt materials or other materials similar to those of the existing pavement layers. 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.

Add the following to this clause:

903.1 Maintenance of Right of Way
Throughout the period of the Contract the Contractor shall at all times maintain public vehicular access to the right of way, within the right of way and from the right of way to all public and private land, as it was immediately prior to his commencement of the Works.

The Contractor may, on submission of written request to the Engineer, including a drawing, programme and specification, be given approval to operate:

A road diversion suitable for the road traffic and suitable width or

Traffic on a one-way system using manual coordinated direction control or automatic traffic lights having a secure source of power.

Applications for approval shall show every detail of the proposals including road construction cross section including pavement, surfacing, profile and drainage, road signing, communication between the ends of the controlled section lighting and the proposed period of operation.

One way systems shall be provided with adequate sign posting and the Contractor shall limit delays to any traffic to the minimum and with the approval of the Engineer. The travelling public shall be notified by signs, of exceptional delay well in advance of the site of delay, as required by the Engineer.

Payment for temporary diversions, traffic provisions and maintenance of roadways shall be as provided in the Contract and as instructed by the Engineer.

904 Construction of Deviations
Add the following paragraph between the second and the third paragraphs of Item (a):

The Contractor shall programme his works in such a way that traffic shall not be required to pass over more than 1.5 km at any one time unless otherwise approved by the Engineer.

906 Passage of Traffic through the Works
Add the following to this Clause.

The Contractor shall be deemed to have inspected the site and satisfied himself as to the adequacy of his bid for these works and no additional payments will be made for any expenditure on traffic control. Should the Contractor propose any other method of passage of traffic including construction of traffic deviations and use of the existing roads the Contractor shall investigate the alternatives, construct and maintain them to the satisfaction of the Engineer. The Employer shall not be liable for investigations or costs arising from the alternatives methods of traffic control proposed by the Contractor. Deviations or other measures for traffic control where proposed by the Contractor shall meet the requirements of the specifications and drawings and be approved by the Engineer.

The Contractor shall ensure that the workforce and site supervisory staff at all times wear high visibility garments when work is carried out on or adjacent to a section of the road open to traffic. The Contractor shall ensure that the supervisor or person in charge of the work force is readily recognized from the rest of the workforce. In addition, the Contractor shall provide a locally qualified full time traffic safety officer to coordinate aspects of road safety for the whole site.

The Contractor shall be deemed to have included all costs related to employing the traffic safety officer and for all the duties performed by him in his rate for passage of traffic.

912 Measurement and payment
Item: Construction of Deviation

Amend as follows:
The rate for construction of deviation shall include provision, placing, forming and compaction of gravel sub-base, stone base and bituminous wearing courses.

Item: Provide and Maintain Road Signage's

Unit: Lump Sum
Payment of the lump sum shall be through equal monthly instalments over the period of the Contract on a pro rata basis subject to the approval of Engineer.

Item: Maintain existing Roads and deviations

Unit: Lump Sum
Payment of the lump sum shall be paid per kilo metre length the period of the Contract, excluding the Defects Liability Period provided that the total sum of instalments paid shall not exceed the lump sum;

Item: Reinstatement of Deviations

In the first paragraph of Clause 912 (h), delete the words "by the lump sum stated in the Special Specification' and replace with 'as described under Item 9.04 of the Bill of Quantities".

1100 SHOULDERS AND FOOTPATHS
Add the following to this section:

1107 Footpaths
Where shown on the drawings or directed by the Engineer, footpaths shall be constructed. The Footpaths shall be constructed using the precast concrete paving blocks as the finish or asphalt or gravel wearing course. The line of the footpaths shall be as shown on the drawings or as directed by the Engineer.

1107.1 Pre-cast Concrete Paving Blocks
Precast concrete blocks shall be hydraulically pressed, complying with BS 7263: Part 1. Blocks shall be laid in accordance with BS 7263: Part 2 to the required cross fall.

1107.2 AC Surfacing for Footpaths and other Paved Areas
AC surfacing for footpaths and paved areas shall be laid in compliance with section 16 of the Standard Specification.

Surfacing shall be laid true to level and cross fall as shown on the drawing or instructed by the Engineer. Payments for flexible surfacing on footpaths will be measured and paid in accordance with the provisions of section 16 of Standard Specification.

1108 Measurement and Pavement

Item: Precast Concrete Paving Blocks

Unit: m2
Precast concrete blocks shall be paid by the area measured on plan. The rate shall include for supplying, laying the bedding, jointing, compacting, laying at kerbs and radii and all the Contractor’s obligations with respect to this clause.

1300 GRADED CRUSHED STONE SUBBBASE AND BASE

1303 Material requirements

The material for graded crushed stone Sub-base/base shall comply with requirements for Sub-base stone Class B 0/40 and that for the Base stone Class B. 0/30. After compaction and compliance with the requirements of Clause 1403 of this specification below, the Sub-base/Base graded crushed stone material shall have a maximum of 8% of particles smaller than 0.075 mm and the resultant layer shall comply with all requirements of Section 13 of the Standard Specification.

The crushing ratio for all graded crushed stone pavement materials shall be minimum 100%.

1306 Laying and Compacting of Graded Crushed Stone Sub-base and Base

Graded crushed stone shall be laid by a paving machine. Single compacted layers shall not be more than 150mm. where layers of more than 150mm are to be laid, multiple layers shall be applied as specified or as shall be instructed by the Engineer. No singular layer shall be less than 75mm in thickness after compaction.

Add the following to this section:

1311 In Situ Reprocessing of Graded Crushed Stone

In pavement reconstruction sections with an existing graded crushed stone base, the existing graded crushed stone shall be used in pavement and shoulder construction. The bituminous layer shall be removed to spoil or for recycling as instructed by the Engineer, leaving in place the existing graded crushed stone base in situ. After removal of surfacing, the graded crushed stone shall be jointly inspected by the Engineer and Contractor and any contaminated material re-used in earthworks, deviations or disposed off in manner approved by the Engineer. Where the contaminated layer extends into a lower pavement layer, the Existing sub-base or sub-grade layer shall be reworked and re-compacted before reprocessing the graded crushed stone layer. Before addition of any stone material the existing surface shall be lightly compacted to remove undulations and levels taken. The Contractor shall confirm the grading of the stone material and shall add imported material, mixed in such a manner that the reprocessed material shall comply with the requirements of Clause 1303 of the Standard Specification. The material shall be scarified, mixed, watered, spread and compacted as sub-base or base in the carriageway and/or shoulders as shown on the drawings or directed by the Engineer.

1400 CEMENT TREATED MATERIALS

1403 Cement Treatment

Cement for improvement shall be Ordinary Portland Cement 42.5 N complying with Clause 207 of the Standard Specification. The cement content of the improved graded crushed stone material will be minimum 2% by weight. The actual cement content requirement will be determined on site after laboratory tests results followed by site trials.

14A LEAN CONCRETE

14A/04 Mix Requirements

Proportions
The ratio of cement to aggregate shall be 3% by weight (including any absorbed moisture but excluding free water in the aggregate).

14A/05 Method of Construction

Curing
Add the following to this Clause:

The lean concrete shall be protected from injuries action by sun, rain, flowing water, frost, or mechanical injury. At completion of finishing and at the time the concrete surface has hardened enough to prevent the surface being marred by the curing material it shall be cured by one or more of the following methods:

Moist Curing:
Wet the concrete surface with a fine spray of water and cover with water proof paper, polythene-coated burlap, or polythene sheeting. Thoroughly saturate polythene-coated burlap with water before placing. Select size of sheets that are at least 300 mm longer than necessary to cover the entire width and edges of base. Place sheets with light coloured side up. Overlap adjacent sheets not less than 300 mm with the lapped edges securely weighed down or the sheets lapped 150 mm and cemented or tampered to form a continuous cover and closed joint. Place the weight on the cover down to prevent displacement or billowing from winds. Fold coverings down over the exposed edges and secure with a continuous bank of earth or other approved means. Use covers in good condition when placed and immediately repair tears and holes they occur during the 7-day curing period.

Liquid Membrane-forming Compound Curing:
Apply compound immediately after surface loses its water sheen and has a dull appearance. The curing membrane method should conform to AASHTO M 148. Mechanically agitate curing compound during use. Apply at maximum rate of 5.0 square meters per litre of compound. If compound lacks uniform continuous coherent films or exhibits checks, cracks, peels, or pinholes, apply an additional coat of compound to areas where films is defective. Have readily available impervious sheet curing for use to protect freshly placed concrete in the event that conditions occur to prevent correct application of compound at the proper time. Re-spray surfaces with curing compound after rainfall. Apply at the same rate required above.

The concrete surfaces shall be protected from foot and vehicular traffic and other sources of abrasion for a minimum of 72 hours. The curing method adopted shall be maintained for the entire curing period.

14A/08 Measurements and payment

Item: Curing lean concrete

Unit: m^2
The unit of measurement shall be the area of surface cured satisfactorily. The rate shall allow for complying with Section 14A of the Standard Specification.

1500 BITUMINOUS SURFACE TREATMENTS AND SURFACE DRESSING

1502B Materials for Seal Coat, Prime Coat and Tack Coat

Binder for Surface dressing shall be 80/100 penetration grade bitumen, It shall be applied on 19 mm Superpave AC wearing course at a pray rate of 1.0 – 1.2 l/m2. Surface dressing shall take place after initial trafficking of the superpave AC by vehicular traffic or as the case may be. Due to porous nature of superpave AC, consideration of the effect of the prevailing weather may determine the shortening of the duration for trafficking to the bare minimum prior to surface dressing. At least two weeks should be allowed for trafficking before surface dressing.

The binder for prime coat shall be MC 30 cutback bitumen. This shall be applied over granular surface to receive any bituminous layer.

(iii) The binder for tack coat shall be K1-70 bitumen emulsion. This shall be applied at a spray rate of 0.3 – 0.8 l/m2 over 37.5 mm Superpave DBM base to receive 19 mm Superpave AC wearing course.

1504B Spraying of Seal Coat, Prime Coat and Tack Coat

Refer to 1502B - (i), (ii) & (iii) above

1600 BITUMINOUS MIXES FOR BASES AND WEARING COURSES

1600A GENERAL

1603A Construction Plant

Compaction Plant
To achieve specified densities, it is expected that vibrating rollers will be required to achieve satisfactory results. It is essential that thorough pre-construction 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.

1606A Site trials

Delete the second paragraph and insert the following:

The trials shall be carried out to:
Test materials designed in the laboratory so that a workable mix, which satisfies the specified requirements can be selected.

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 and 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 homogenous mixture but for no longer.

The Aggregates and bitumen shall each be heated to enter the mixing chamber at temperatures selected within the range 150 oC to 170 ○C. The temperature of the stone at entry to the mixing chamber shall not be more than 15 oC 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 of 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 not less than 135○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 aggregates 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 carbonized mixtures which form 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 the entire clause and replace it with the following

The mix shall be transported from the mixing plant to the spreader in truck 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 solvent 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 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 paragraphs:

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

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 a manner as to ensure a continuous bond between the old and new pavement. All contact surfaces at cold joints, and joints with structures including manholes and pits shall be coated with a thin and uniform coat of MC 70 or other medium curing bitumen.

1610A Compaction
Add the following paragraphs:

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 materials 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 results of reversing the direction of the rollers, 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 incidentals 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 to this clause:

Construction joints in the various pavement layers shall be staggered by at least the following distances

Joints in Wearing Course: 500 mm

Joints in Dense Bitumen Macadam base: 400 mm
The contractor shall produce a plan showing all pavement construction joints for approval by the Engineer before pavement construction commences.

Transverse joints in Dense Bitumen Macadam Base and Wearing Course shall be staggered by at least 500 mm. 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 500 mm at the end of the lane shall be left un-compacted.

Cold transverse joints shall be cut back to expose an even, vertical service 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 sizes, +3% by total weight of dry aggregate including mineral filler

Passing 0.075 mm sieve, +2% by total weight of dry aggregate including mineral filler

1600B ASPHALT CONCRETE FOR SURFACING

1602B Materials for Asphalt Concrete
Penetration grade bitumen

Delete sub-section (a) and replace with the following:
Bitumen 60/70 penetration grade shall be used in production of 19 mm Superpave AC wearing course, and shall meet the requirements of Table 4.3 in ORN 19 as summarized below:
Bitumen 60/70 penetration grade bitumen shall be used in the production of AC type 1 wearing course using 0/10 mm chippings. Type 1 AC wearing course has been proposed to be laid on service roads, foot paths/walkways, Low Volume Seal Accesses to Public Facilities such as Schools & Hospitals, NMT routes in event concrete paving blocks shall not be used

Table 4.3 (ORN 19) Minimum requirements for penetration grade bitumen

Test, based on Original Bitumen	Test Method (ASTM)	Penetration Grade	
Penetration at 25°C	D5	60/70	80/100
Softening point (°C)	D36	46-56	42-51
Flash point (°C) (Min)	D92	232	219
Solubility in Trichloroethylene (%) (min)	2042	99	99
TFOT heating for 5h at 163°C:			
(a) Loss by mass (%), (Max)	D1754	0.5	0.8
(b).Penetration (% of Original), (Min)	D5	54	50
(c).Ductility at 25°C, (Min)	D113	50	75

The bitumen for asphalt concrete works (19 mm Superpave AC wearing course and 37.5 mm Superpave DBM base) shall be 60/70 penetration grade.

Mineral Filler
Under this sub-clause in the Standard Specification, rename Table 16B-1 as 16B-1 (a)

Add the following

The coarse aggregate shall entirely be crushed rock from a source known to give high values of stability (>9 kN) in the Marshall Test. Crushed river gravel shall not be used. Aggregate shall be Class “a” meeting the requirements given in Table 16B-1(b) below.

Table 16B-1(b) Requirements for coarse aggregate (retained on 6.3-mm sieve)

Property	Test	Property
Cleanliness	Sand equivalent for <4.75 mm fraction (Material passing 0.425 sieve) Plasticity index[2] Linear shrinkage	>40 <4 <2
Particle shape	Flakiness index (FI)[3]	<25

Strength	Aggregate Crushing value (ACV)[4] Aggregate impact value (AIV)[4] 10% FACT (dry) KN[4] Los Angeles Abrasion (LAA)[5]	<25 <25 >160 <30
Abrasion	Aggregate Abrasion Value[4]	<12
Soundness[7]	Sodium Sulphate Soundness (SSS): Coarse aggregate Fine aggregate Magnesium Sulphate Soundness (MSS): Coarse aggregate Fine aggregate	 <10 <16 <15 <20
Polishing	Polished Stone Value	>60
Water absorption	Water Absorption[6]	<2
Bitumen affinity	Immersion Mechanical test: index of retained Marshall stability [8] Static immersion test[9] Retained indirect Tensile strength10	>75 >95% coating retained >79% (at 75% VIM)

AASHTO 1176
British standard 1377, part 2
British standard 812, part 105
British standard 812, parts 110 to 114
ASTM C131 and C535
British standard 812, part 2
AASHTO T104
D whiteoak (1990) (shell bitumen handbook)
AASHTO T182
AASHTO &283

The aggregates for bituminous mixes shall be stored in single sizes in separate bins or in areas covered with tightly laid wood planks, sheet metal, hard compact gravel, concrete or other hard and clean surfaces. The surfaces 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 bulkheads.

1603B Grading Requirements
The grading mixture of a coarse and fine aggregate shall be within and approximately parallel to the grading envelopes as given in table 16B-1(a) for 0/20 binder coarse. In addition, the material shall comply with the requirements below.

The Contractor shall investigate a number of gradings so that a worktable mix, which also retains a minimum of 3% voids in mix (VIM) at refusal density, is identified. As guidance towards identifying a suitable grading, recommendations are provided in Tables 16B-1(c) and (d)

Table 16B-1(c): Superpave aggregate grading control point

Nominal Maximum Size (mm), (Note 1 below)	Sieve size (mm)	Control point (%passing)	
37.5	0.075 2.36 25.0 37.5 50	0 15 90 100	6 41 90 100 -

19.0	0.075 2.36 12.5 19.0 25.0	2 23 - 90 100	8 49 90 100 -

Table 16B-1(d): Superpave boundaries of aggregate restricted zone

Sieve size within restricted zone	Minimum and maximum boundaries of Sieve size for nominal maximum aggregate size (minimum /maximum % passing)	
	37.5	19.0
4.75	34.7-34.7	-
2.35	23.3-27.3	34.6-34.6
1.18	15.5-21.5	22.3-29.3
0.6	11.7-15.7	16.7-20.7
0.3	10.0-10.0	13.7-13.7

Note (1): The definition of Nominal Maximum Size of aggregate is one sieve larger than the first sieve to retain more than ten per cent of the aggregate. It is also recommended that where possible that largest particle size should not be more than 25 mm so that the requirements of the marshal test can be complied with.

Mixes identified for compaction trials shall be manufactured to the laboratory design bitumen content and two other bitumen contents of + 0.5 % and 1.0% additional bitumen. Cores will be cut to determine the density of compacted material. The core will then be re-heated to 145±5°C in the appropriate mould and compacted to refusal in the vibrating hammer test. The cores cut from the compaction trial must have a destiny equivalent to 95% refusal density.

The compaction trials will identify a workable mix which can be made to bitumen content which gives 3% voids in mix (VIM) at refusal density.

1604B Requirements for Asphalt Concrete
The nominal binder content shall be 5.0% - 5.5% in addition to the requirements given in Table 16B-2 0f the Standard Specification. The maximum Marshall stability of the mix for 2x75 blows shall be 9 kN and, at compaction to refusal, it shall have 3% voids in mix (VIM).

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 a crushed rock which is known from past experience to give good results in the test procedure. A grading conforming to the type I binder course detailed in Table 16B-1(a), 0/20, of the Standard Specification should be tested (but with 100% passing the 25 mm sieve) and it shall meet the requirements of Table 16B-2 of this specification.

Having established the suitability of the aggregate source several gradings shall be tested in the laboratory, including that used for the Marshall Test, to establish relationships between bitumen content and VIM at refusal density. For each mix, samples will be made up to a range of bitumen contents and compacted to refusal using a gyratory compactor and a vibratory hammer in accordance with BS 598 (Part 104:1989) with the following revision.

“It should first be confirmed that compaction on one face of the sample gives the same refusal density as when the compaction cycle is applied to both faces of the same sample. The procedure which gives the highest results shall be used”

From the bitumen content –VIM relationship, bitumen content which corresponds to VIM of 3% shall be identified. Compaction trial shall be undertaken to confirm the workability of the mix. At least two or more grading will be required for compaction trials. The compaction trials will identify a workable mix which can be to a bitumen content which gives 3% voids mix (VIM) at refusal density.

1605B Mixing and laying asphalt concrete
The temperature of the bitumen and aggregates when mixed shall be 110±3°C above the softening point (Ring and Ball) of the bitumen.

Compaction shall commence as soon as the mix can support the roller without undue displacement of material and completed before the temperature of the mix falls below 90°C.

1606B Compaction
Rolling shall be continued until the voids measured in the completed layer are in accordance with the requirement for a minimum compacted density of 98% of Marshall Test or a minimum mean value of 95% of refusal density (with no value less than 93%) as appropriate.

1608B Sealing bituminous surface
After the Wearing Course has been trafficked and bitumen has hardened, the Wearing Course shall be sealed with 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.

1600C 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, and 1605B of these Specifications. Binder for production of 37.5 mm Superpave base shall be 60/70 bitumen

1603C Grading Requirements for Dense Bitumen Macadam
The nominal binder content shall be as stated in the Bill of Quantities and the aggregate size shall be as per Overseas Road Note (ORN) 19 Table D2 for 37.5 mm

1606C Compaction
Delete the entire paragraph and replace it with the following

Compaction shall be continued until voids measured in the completed layer are within the range specified in Table 16C-1 or to a mean value of 95 per cent of refusal density (with no value less than 93 per cent) as appropriate.”

1700 CONCRETE WORKS

1703 Materials for Concrete

Materials
Cement: Cement to be used for concrete works shall be Ordinary Portland 42.5 N

Selected rock: The selected rock boulders to be placed for this work shall be Hard, sound and durable quarry stones as approved by the Engineer.
Samples of the stone to be used shall be submitted to and approved by the Engineer before any stone is placed.

The maximum size of the stone boulders shall be 300 mm.

Concrete classes:

Class	Proposed use
15/20	Blinding to foundations of piers, abutments, retaining walls box culverts, bridge works and pipe culverts
25/20	Box culvert's walls and slabs
30/20	Bridge works ie columns, beams, deck slab and walls
40/20	Pier caps and precast concrete girders (This class has replaced class 35/20 which is not in the Standard Specification for Road and Bridge construction)

Construction Method
After completion of the structural excavation the surface of the loose soil shall be levelled and compacted. Then the stone of the above sizes shall be placed in one layer of 250 mm over the compacted bed where the bottom slab will rest. Coarse sand shall spread to fill up the voids in the stone boulders, and compaction with vibratory compactors should be performed to make this layer dense whereon a concrete of levelling course shall be placed.

Measurement and Payment
Measurement for the bedding materials shall be made in cubic metres for the completed and accepted work, measured from the dimension shown on the Drawings, unless otherwise directed by the Engineer.

Payment for the bedding Materials for Levelling Concrete Works shall be full compensation for furnishing and placing all materials, all labour equipment, tools and all other items necessary for proper completion of the work in accordance with the Drawings and specifications and as directed by the Engineer.

Add the following for fine aggregate

It shall also meet the following requirements.

Test	Test Method	Requirement
Fineness Modulus	AASHTO M6	2.0-3.5
Sodium Sulphate Soundness loss on 5 cycles	AASHTO T104	10% Max.
Friable particles content	AASHTO T112	1% Max.
Test for organic impurities	AASHTO T21	Lighter than standard
Sand equivalent	AASHTO T17	75% Min.
Fraction passing 75 micron sieve	AASHTO T27	5% by weight max. (10% max. for crusher dust)

Add the following for course aggregate

The coarse aggregate shall conform to the following quality requirements:

Test	Test Method	Requirement
Sodium Sulphate Soundness loss on 5 cycles	AASHTO 104	12% max.
Los Angeles Abrasion	AASHTO T96	40% Max.
Content of Friable Particles	AASHTO T112	1% by weight Max.
Soft Fragments and Shale	AASHTO M80	Max. 5% by weight
Flaky Pieces	BS 812	20% Max.
Elongated pieces	BS 812	20% Max.
Combined quantity of chlorides calculated as sodium chloride and sulphates as sodium sulphate	ASTM D1411	1000 ppm, Max.

Add the following to Clause 1703(g):

The water for mixing and curing concrete shall not contain solids and impurities more than the following permissible limits:

Impurities	Permissible Limits
Organic, mg/l	200
Inorganic, mg/l	3000
Sulphates (as SO4), mg/l	500
Chlorides (as Cl), for plain cement concrete work and 1000 mg/l for reinforced concrete work mg/l	2000

The pH value of work shall generally be between 6 and 8.

Add the following to Clause 1703:

Limits for Total Chemical Impurities in concrete

For reinforced concrete work the total chemical impurities collected from aggregates, cement, admixtures and water shall not exceed the following limits:

Impurities	Permissible limits of undesirable chemicals in concrete in percentage by weight of cement
Chlorides (as Cl ion), (%)	0.06
Sulphates (as SO3), (%)	4.0

1703a Levelling of Concrete for Bottom Slab Including Formwork Cost
This work shall consist of placing and levelling lean or blinding concrete Class 15/20 over the prepared bed of stone boulders in the foundation for bottom slab and wing walls in accordance with these specifications and in conformity with the lines, grades, thickness and typical cross-sections shown on the drawings unless otherwise directed by the Engineer.

Materials for levelling concrete

Requirement for the concrete class 15/20 is specified as follows:

Design compressive strength, 28 days:	15 N/mm2
Maximum size of coarse aggregate:	20 mm
Maximum cement content:	300 kg/m3

Maximum water/cement ratio of 50% with slump of 80 mm

Construction Method
The bed of stone boulders upon which the levelling concrete will be placed shall be smooth, compacted and true to the grades and cross-section shall be set to the required lines and grades.

Measurement and payment
Measurement for levelling concrete (Class 15/20) shall be made in cubic metres completed and accepted levelling concrete work measured in place and which has been executed in accordance with the drawings and the Specifications.

Payment for this work shall include furnishing and placing all materials, labour, equipment and tools, and other incidentals to specifications and as directed by the Engineer.

1703b Reinforcement Bars for Walls and Slabs
This work shall consist of furnishing, fabricating and placing in the concrete of the bottom slab, top slab, median wall, sidewalls, wing walls and aprons, reinforcing bars of the quality, type and size in accordance with these specifications and in conformity with the requirements shown on the Drawings.

Material
Reinforcement bars shall be deformed and shall meet the requirements of British Standard BS 4461, unless otherwise called for on the drawings or approved by the Engineer.

No reinforcement bar shall be delivered without a certificate guaranteeing the yield stress. The reinforcement bars shall be kept off the ground, free from dirt, oil, grease, or avoidable rust and stored within a building or provided with suitable covers.

If it is necessary for the Engineer to ascertain the quality of the reinforcement bars, the Contractor shall test the reinforcement bars, at his own expense, by the means as directed by the Engineer.

Construction Method

Bar Bending Schedule
The Engineer shall provide the Contractor with bending schedules showing the location types, sizes, bending dimensions and cut lengths of the reinforcement bars required to be fixed in the works.

Cutting and bending
Qualified men shall be employed for the cutting and bending and proper application shall be provided for such work.

Bars shall be cut and bent cold to the dimensions indicated and with equipment and methods approved by the Engineer.

Stirrups and tie bars shall be bent around a pin having a diameter not less than 15 times the minimum diameter of the bars. Bends of other bars, where full tension in the bar may occur, shall be made around a pin having a diameter not less than 7.5 times the bar diameter as shown on the drawing.

Reinforcing bars shall be accurately formed to the shapes and dimensions indicated on the Drawings, and shall be fabricated in a manner that will not be injurious to the materials.

Placing
Reinforcing bars shall be accurately placed in proper position so that they be firmly held during placing of concrete.

Bars shall be tied at all intersections by using annealed iron wire 0.9 m or larger diameter or suitable clips.

Distances from the formwork shall be maintained, corrected by means of metal hangers, metal blocks, metal supports or other supports approved by the Engineer.

The Engineer shall inspect the formwork and reinforcement bars after placing. When a long time has elapsed after placing reinforcement bars, they shall be cleaned and inspected again by the Engineer before casting concrete.

Splicing and Joint
When it is necessary to splice reinforcement bars at points, position and methods of splicing shall be determined based on strength calculations and approved by the Engineer.

In lapped splices, the bars shall be lapped by the required length, and wired together at several points by using annealed iron wire larger than 0.9 mm.

When a long time has elapsed after placing reinforcement bars, they shall be cleaned and inspected again by the Engineer before placing concrete.

Joint
Exposed reinforcement bars intended for bonding with future extensions shall be effectively protected from injury and corrosion.

Oxyacetylene welding joint of reinforcing steel shall be carried out only if authorized by the Engineer in writing.

Measurement and Payment
Bending and installation of reinforcement bars of piers and abutments shall be measured in terms of tonnes. The length of steel bar of each size will be shown on the drawings in which the bar length for splicing is excluded. In computing the weight to be measured, the theoretical weights of bars of the cross-section shown on the Drawings or authorized shall be used. These weights are given in the table below.

Bar Type and the Nominal Diameter in Millimetres	Weight of Bar in Kilograms per 12 m length of bar
T10	7.40
T12	10.66
T16	18.95
T20	29.60
T25	46.30
T32	75.80

1703c Formwork for Vertical Walls and Slabs
This work shall consist of all temporary moulds for forming the concrete for culvert walls and slabs together with all temporary construction required for their support. Unless otherwise directed by the Engineer all formwork shall be removed on completion of the walls and slabs.

Materials
Formwork shall be made of wood or metal and shall conform to the shape, lines and dimensions shown on the Drawings.

All timber shall be free from holes, loose material, knots, cracks, splits and warps or other defects affecting the strength or appearance of the finished structure.

Release agents shall be either neat oils containing a surface activating agent, cream emulsions, or chemical agents to be approved by the Engineer.

Construction Method

Formworks
Formwork shall be designed to carry the maximum loads, which may be imposed and so be rigidly constructed as to prevent deformation due to load, drying and wetting, vibration and other causes. After formwork has been set in correct location it shall be inspected and approved by the Engineer before the concrete is cast.

If requested, the Contractor shall submit to the Engineer working drawings of the formwork and also calculations to certify the rigidity of the formwork.

Unless otherwise described in the Contract, all form joints for exposed surfaces of concrete shall form a regular pattern with horizontal and vertical lines continuous throughout each structure and all construction joints shall coincide with these horizontal and vertical lines. PVC pipes of 50 mm diameter for weep holes shall be arranged as shown on the Drawings.

Unless otherwise specified, formwork shall be designed to form chamfers at all external corners whether or not such chamfers are shown on the Drawings to prevent cracks and other damage from arising.

The inside surface of forms shall be cleaned and coated with a releasing agent to prevent adhesion of the concrete. Release agents shall be applied strictly in accordance with the manufacturer's detailed instructions. The release agent shall be applied to the formwork prior to erection. Release agent must not come into contact with reinforcement. Immediately before concrete is cast, the formwork shall be thoroughly cleaned and freed from sawdust, shavings, dust, mud or other debris by hosing with water. Temporary openings shall be provided in the formwork to drain away the water and rubbish.

Scaffolding
All scaffolding required to support the formwork shall be designed and constructed to provide necessary rigidity and support the loads without appreciable deflection or deformation.

Details, plans and structural and flexural calculations for scaffolding shall be submitted to the Engineer for approval, but in no case shall the Contractor be relieved of his responsibility for the results obtained by use of these details.

Removal of formwork
The time at which the formwork is removed shall be the Contractor's responsibility and the formwork shall not be removed until the concrete strength has reached the strength to the approval of the Engineer

Measurement and Payment
No measurement shall be allowed for formwork of temporary construction joints.

Payment for the formwork shall be incidental to the pay items of particular grade of concrete for furnishing, erecting, jointing all the formwork for the concrete including furnishings and applying release agent, and construction of the required scaffolding to support the formwork all conforming to the shape, lines, grade and dimensions of the structure as shown on the Drawings, all in accordance with the Drawings and as directed by the Engineer.

1703d Concrete Works to Vertical Walls and Slabs
This work shall consist of furnishing, mixing, delivering and placing of the concrete for the construction of culvert walls and slabs in accordance with these specifications and in conformity with the requirements shown on the Drawings.

Concrete class 25/20 shall be used for Culvert walls and slabs.

Concrete Materials

Cement:

DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI (B32) ROAD:

Cement shall be of Ordinary Portland 42.5 N and shall conform to the requirements of BS 12 or equivalent.

The Contractor shall select only one type or brand of cement. Changing of the type or brand of cement will not be permitted without a new mix design approved by the Engineer. All cement is subject to the Engineer's approval. However, approval of cement by the Engineer shall not relieve the Contractor of his responsibility to furnish concrete of the specified compressive strength requirements.

Conveyance of cement by jute bags shall not be permitted. Storage in the Contractor's silo or storehouse shall not exceed more than two (2) months and age of cement after manufacture at mill shall not exceed more than four (4) months. The Contractor shall submit to the Engineer for his approval the result of quality certificate prepared by the manufacturer.

Whenever it is found out that cement has been stored too long, moist or caked, the cement shall be rejected and removed from the project.

Aggregates
Fine and coarse aggregates must be clean, hard, strong and durable, and free from absorbed chemicals, clay coating or materials in amounts that could affect hydration, bonding, strength and durability of concrete.

Grading of aggregates shall conform to the requirements in the tables below.

Grading of Fine Aggregate

Sieve Size (mm)	Percentage by Weight Passing
10	100
5	89– 100
2.5	60– 100
1.2	30– 100
0.6	15 – 54
0.3	5– 40
0.15	0– 15

Grading of course aggregate

Size Coarse Aggregate	Amounts finer than each standard sieve percentage by weight							
	40	30	25	20	15	10	5	2.5
	100	-	-	90-100	-	30 - 69	0 - 10	-

Other requirements for aggregates are as detailed below:

Fine Aggregates

Fitness Modulus, AASHTO	M – 6
Sodium Sulphate Soundness, AASHTO T104:	Max. 10% loss
Content of Friable Particles AASHTO 112:	Max 1% by weight
Sand Equivalent, AASHTO T176:	Min. 75

Coarse Aggregate

Abrasion, AASHTO T96	Max 405 loss
Soft Fragment and shale, AASHTO M80:	Max. 5% by weight
This and elongated Pieces, AASHTO M80:	Max. 15%

Water
All sources of water to be used shall be approved by the Engineer. Water shall be free from injurious quantities of oil, alkali, vegetation matter and salt as determined by the Engineer.

Admixture
Only admixture, which have been tested and approved in the site laboratory through trial mixing for design proportion shall be used. Before selection of admixture, the Contractor shall submit to the Engineer the specific information or guarantees prepared by the admixture supplier. The Contractor shall not exclude the admixture from concrete proportions.

Chemical admixtures where permitted shall conform to the requirements of AASHTO M194. Unless otherwise specified, only Type A (Water reducing), Type B (Retarding), Type D (Water reducing and retarding), Type F (Water reducing, high range) or Type G (Water reducing, high range and retarding) shall be used.

Admixtures containing Chloride ion (Cl) in excess of one percent by weight of the admixture shall not be used in reinforced concrete.

A Certificate of Compliance signed by the manufacturer of the admixture shall be furnished to the Engineer for each shipment of the material used in the works.

Concrete class 25/20
Concrete Class 25/20 shall be used for culvert walls and slabs. The requirements of concrete Class 25/20 are provided as follows unless otherwise the Engineer will designate any alteration.

Design compressive strength, 28 days: 25N/mm2
Maximum size of coarse aggregates: 20 mm
Maximum water/cement ratio of 45% with slump of 80 mm

Proportioning Concrete
The Contractor shall consult with the Engineer as to mix proportions at least thirty (30) days prior to beginning the concrete work. The actual mix proportions of cement, aggregates, water and admixture shall be determined by the Contractor under supervision of the Engineer in the site laboratory.

The contractor shall prepare the design proportions which has 120% of the strength requirement specified for the designated class of concrete.

No class of concrete shall be prepared or placed until its job-mix proportions have been approved by the engineer.

Concrete Work

Batching
Batching shall be conducted by weight with accuracy of:

Cement	0.5 %
Aggregate	0.5 %
Water and Admixture	1 %

Equipment should be capable of measuring quantities within these tolerances for the smallest batch regularly used as well as for larger batches.

The accuracy of batching equipment should be checked every month in the presence of the Engineer and adjusted when necessary.

Mixing and delivery
Slump of mixed concrete shall be checked and approved at an accuracy of +25 mm against designated slump in these specifications.

Concrete in hot weather
No concrete shall be placed when the ambient air temperature is expected to exceed thirty-three degrees Celsius (33○C) during casting operations.

Concreting at night
No concrete shall be mixed, placed or finished when natural light is insufficient, unless an adequate approved artificial lighting system is operated; such night work is subject to approval by the Engineer.

Placing
In preparation of the placing of concrete, the interior space of formwork shall be cleaned and approved by the Engineer prior to casting concrete. All temporary members except tie bars to support formwork shall be removed entirely from the formwork and not buried in the concrete. The use of open and vertical chute shall not be permitted unless otherwise directed by the engineer.

The Contractor shall provide a sufficient number of vibrators to properly compact each batch immediately after it is cast in the formwork.

Measurement and Payment
Measurement for the Concrete Works Class 25/20 of culvert walls and slabs shall be made in cubic metres for the walls and slabs actually constructed, measured from their dimensions shown on the drawings. Payment for the Concrete Works (Class 25/20) of culvert walls and slabs shall be the full compensation for furnishings all materials of the concrete mixing, delivering, placing and curing the concrete, equipment and tools, labour and other incidentals necessary for the completion of the work in accordance with the Drawings and these specifications and as directed by the Engineer.

1704 Concrete Works of the Beams and Deck Slabs

1704.1 Description
This work shall consist of furnishing, mixing, delivering and placing of the concrete for the construction of the in situ beams and deck slab, including form F3 type finish, in accordance with Standard Specifications and in conformity with the requirements shown on the Drawings.

1704.2 Concrete materials

Cement
Cement shall be of Ordinary Portland 42.5 N and shall conform to the requirements of BS or equivalent.

The Contractor shall select only one type or brand of cement or others. Changing of the type of cement will not be permitted without a new mix design approved by the Engineer. All cement is subject to the Engineer's approval. However, approval of the cement by the Engineer shall not relieve the Contractor of the responsibility of furnishing concrete of the specified compressive strength requirements.

Conveyance of cement by chute bags shall not be permitted. Storage in the

Contractor's silo or store house shall not exceed more than two (2) months, and the age of cement after submitting to the Engineer the result of quality certificate prepared by the manufacturer for his approval.

Whenever it is found out that cement have been stored too long, moist, or caked, the cement shall be rejected and removed from the project.

Aggregates
Fine and coarse aggregates must be clean, hard, strong and durable, and free from absorbed chemicals, clay coating, or materials in amounts that could affect hydration, bonding, strength and durability of concrete. The aggregates should conform to BS 882.

Grading of aggregates shall conform to BS 812.

Other requirements for aggregates are as given below.

Fine Aggregates

Fitness Modules	AASHTO M-6	2.3 to 3.1
Sodium Sulphate Soundness	AASHTO T104	Max. 10% loss
Content of Friable Particles	AASHTO 112	Max. 1% by weight
Sand Equivalent	AASHTO T176	Min.75

(ii) Coarse Aggregate

Abrasion	AASHTO T96	Max. 405 loss
Soft Fragment and Shale	AASHTO M80	Max. 5% by weight
Thin and elongated pieces	AASHTO M80	Max. 15%

(c) Water

All sources of water to be used shall be approved by the Engineer.
Water shall be free from injurious quantities of oil, alkali, and vegetable matter and salt as determined by the Engineer.

(d) Admixture

Only admixture which have been tested and approved in the site laboratory through trial mixing for design proportion shall be used.

Before selection of admixture, the Contractor shall submit to the Engineer the specific information or guarantees prepared by the admixture supplier.

The Contractor shall not exclude the admixture from concrete proportions.

1704.2.1 Concrete class 30/20
Concrete Class 30/20 shall be used for box culverts / box bridge walls and slabs. The requirements of concrete Class 30/20 are as detailed below unless otherwise the Engineer will designate any alteration.

Design compressive strength, 28 days: 30N/mm2
Maximum size of coarse aggregates: 20 mm
Minimum cement content: 300 kg/m3, and
Maximum water/cement ratio of 45% with slump of 80 mm

1704.2.2 Proportioning Concrete
The Contractor shall consult with the Engineer as to the mix proportions at least thirty (30) days prior to beginning the concrete work. The actual mix proportions of cement, aggregates, water and admixture shall be determined by the Contractor under supervision of the Engineer in the site laboratory.

The contractor shall prepare the design proportions which has 120% of the strength requirements specified for the designated class of concrete.

No class of concrete shall be prepared or placed until its job-mix proportions have been approved by the Engineer.

1704.2.3 Concreting Work

Batching
Batching shall be conducted by weight with accuracy of

Cement:	½ %
Aggregate:	½ %
Water and Admixture:	1%

Equipment should be capable of measuring quantities within these tolerances for the smallest batch regularly used as well as for larger batches.

The accuracy of batching equipment should be checked every month in the presence of the Engineer and adjusted when necessary.

Mixing and Delivery
Slump of mixed concrete shall be checked and approved against designated slump in these specifications. The time elapsing from when the water is added to the mix until the concrete is deposited in place at the site of the work shall not exceed thirty (30) minutes in case that the concrete is hauled in non agitative type trucks or carriers, or more than sixty (60) minutes in case that it is hauled in truck mixers or other carriers with agitators.

Concrete in Hot Weather
No concrete shall be placed when the ambient air temperature is expected to exceed thirty-three degrees Celsius (330C) during casting operations.

Concreting at Night
No concrete shall be mixed, placed or finished when natural light is insufficient unless an adequate approved artificial lighting system is operated, and such night work is subjected to approval by the Engineer.

Placing
In preparation of the casting of concrete, the interior space of formwork shall be cleaned and approved by the Engineer prior to casting concrete. All temporary members except tie bars to support formwork shall be removed entirely from the formwork and not buried in concrete. The use of open and vertical chute shall not be permitted unless otherwise directed by the Engineer. The Contractor shall provide a sufficient number of vibrators to properly compact each concrete batch immediately after it is cast in the formwork.

1704.3 Concrete class 35/20
Concrete Class 35/20 shall be used for in situ beams, precast beams and deck slabs. The requirements

of concrete Class 35/20 are as detailed below unless otherwise the Engineer will designate any alteration.

Design compressive strength, 28 days:	35N/mm2
Maximum size of coarse aggregates:	20 mm
Minimum cement content:	300 kg/m3, and

Maximum water/cement ratio of 45% with slump of 90 mm

1704.4 Measurement and Payment

Measurement for the Concrete Works for beams and deck slabs shall be made in cubic metres for the walls and slabs actually constructed, measured from their dimensions shown on the Drawings.

Payment for the concrete works of beams and deck slabs shall be full compensation for furnishing all materials of the concrete mixing, delivering, placing and curing the concrete, equipment and tools, labour and other incidentals including form F3 type, necessary for the completion of the work in accordance with the Drawings and these specifications and as directed by the Engineer.

1705 Mixing Concrete

Add the following to Clause 1705 of the Standard Specification.
Mixed concrete from the central mixing plant shall be transported in truck mixers, truck agitators, or other approved containers. The time elapsing from the time water is added to the mix until the concrete is deposited in place at the site of the work shall not exceed 30 minutes when the concrete is hauled in non-agitating trucks, or more than 90 minutes when hauled in truck mixers or truck agitators.

Where concrete is supplied from a central plant, there shall be sufficient transporting equipment to ensure continuous delivery at the rate required. The rate of delivery shall be such as to provide for the proper handling, casting, and finishing of the concrete. The method of delivery and handling the concrete shall be in a way which will facilitate casting with a minimum of re-handling and without damage to the structure or the concrete. The methods of delivery and handling for each site shall be approved by the Engineer. The Engineer may suspend the mixing and casting of concrete at any site for which he considers the Contractor's delivery equipment inadequate until such a time as the Contractor provides additional approved delivery equipment.

Concrete shall be allowed to be placed only when the Engineer or his representative is present at the site and has previously checked and approved in writing the positioning, fixing and condition of the reinforcement, and the alignment and suitability of the formwork.

Concrete shall be placed so as to avoid segregation of the materials and displacement of the reinforcement. When casting involves dropping the concrete by more than 1.5 metres, it shall be conveyed through sheet metal troughs, chutes or other approved pipes. The chutes, troughs and pipes shall be kept clean and free from coating of hardened concrete by thoroughly washing with water after each operation.

Rename Clause 1740 as 1740.1 and add the following to this clause:

1706 Concrete class 25/20
200 mm thick concrete class 25/20 base layer shall be used for construction of truck parking areas as instructed by the Engineer

1740.2 Interlocking Concrete Paving Block

Quality
The block for the paving works shall be as shown on the drawings and as directed by Engineer. The blocks shall be 60 mm thick of quality concrete class of such that yields the strength of 50 N/mm2, having specified the size and type with grey or red or combination of them.

Grading of sand for bedding		Grading of sand for the joint filling	
Sieve Size (mm)	Percentage Passing	Sieve Size (mm)	Percentage Passing
9.52	100	2.36	100
4.75	95– 100	1.18	90 – 100
2.36	90– 100	0.6	60 – 90
1.18	50 – 95	0.3	30 – 60
0.6	25 – 60	0.15	10 – 30
0.3	10 – 30	0.075	0 – 10
0.15	0– 15		
0.075	0		

Foundation of Paving Blocks
Over the prepared and consolidated sub-grade a layer of Sub-base using crushed aggregate shall be

laid to falls and slopes to a compacted thickness of 100 mm and compacted with C-10 tonne roller. Over the prepared sub-base, a layer of 3 mm and down fine sand shall be laid and compacted to 25 mm in thickness and to required falls and slope to the satisfaction of the Engineer.

Paving Blocks Laying
The blocks shall be laid on top of the prepared base in required pattern as directed by the Engineer. On completion of the laying work, approved fine screened sand shall be spread over the paving and the joints filled with fine sand compacted as directed by the Engineer. Extra sand on the surface shall be removed by brushing. When required, the edge blocks shall be cut clean and sharp with approved tools and as per the manufacturer's instructions. The cut edges shall be rubbed smooth before laying. Compaction with a power vibrating plate (Wacker model VPH 70) shall be used suitably as recommended by the approved proprietary manufacturer. Any blocks damaged during laying shall be replaced. The entire work of the installation and materials shall meet the approval of the Engineer.

1741 Measurement and Payment
Delete Clause 1741(c).

Add the following to Clauses 1741 (d), (e) and (f):

Read Clause 1741(l) as follows:

The precast unit of measurement shall be m3 of particular grade of concrete.

Add the following to this section:

1742 Plant and Equipment for Aggregates and Concrete

1742.1 Aggregate Processing Plant
Aggregate processing plant to be provided by the Contractor shall conform to the following:

Type of Plant
Except where aggregates are supplied from commercial sources, a modern and dependable aggregate plant capable of producing satisfactory concrete aggregates in sufficient quantities and the rate necessary to meet the requirements of the construction schedule shall be provided at a location acceptable to the Engineer. Complete facilities shall be provided for proper crushing, washing, classifying, storing, reclaiming and delivering the aggregates to the mixing plant.

Samples and Test
The aggregate plant shall be operated for a sufficient time in advance of the dates set for first placement of concrete to permit the development of procedures which result in high capacity production of aggregates proven by tests to meet all the requirements of this specification.

Fines in Sand
The facilitation for fine aggregate production shall be so designed and operated as to retain the necessary quantity of finer fractions. An excess of fines will not be permitted. If natural sand is from marine source, the sand shall be cleaned of clayey material and washed with potable water before use. All crushing, washing, screening, classifying, blending, batching, or other properties of fine aggregate necessary to meet these specifications shall be performed so as to produce acceptable gradation complying with this specification.

Drainage of Sand
Aggregates shall not be removed directly from the washing or classifying operations to the aggregate bins in the concrete mixing plant, but shall be stored as required, to permit drainage of excess water and in such a manner as to avoid contamination by foreign materials. Sand shall remain free-draining storage for at least 48 hours prior to use.

Segregation
The stockpiles for aggregates shall be formed so as to prevent segregation, and as approved by the Engineer. The deposition and removal thereof shall be conducted in a manner to maintain the uniformity of grading. The side slopes of stockpiled aggregates shall be kept flatter than the angle of

repose to prevent accumulation of coarser material at the bottom of the slope.

Volume of Storage
Sufficient live storage of all size fractions of processed aggregates shall be maintained at all times, to permit continuous placing of concrete at the rates so as to meet the scheduled requirements. If aggregates are stockpiled on the ground, the bottom portion of the stockpile within 300 mm of ground shall not be used. The Contractor may also plan to store sufficient quantity of coarse and fine aggregate so that concreting during the rains can proceed without hindrance as the collection of the same during the rains may be difficult.

Approval of Aggregate Plant Layout
Plans and written specifications for the aggregate processing plant including description and capacity data on the processing equipment, and flow charts of the whole processing operation which shall show rates of flow of material at the various crushing and separation points in the processing, as well as the volumes of the stockpiles and the number and types of equipment to be used in transporting the aggregates from aggregate plant to the mixing plant, shall be submitted to the Engineer in advance of plant erection for his approval.

1742.2 Concrete Plant

A modern dependable batch type mixing plant capable of producing concrete of specified quality and at the rate of output required to meet the specified requirements, and a balanced complement of transporting, handling and placing equipment shall be provided at locations and in a manner approved by the Engineer. The concrete mixing plant shall be completely installed for a sufficient length of time prior to scheduled date for placement of first concrete, to enable the Engineer to make the necessary physical tests, prior to use of the plant for the production of concrete.

Standby Arrangement

As a standby arrangement to the batching and mixing plant, the stationary mixer/mixers of capacity 700 litres of mixed concrete and other appropriate equipment shall be provided.

Type of Plant

The type of plant to be furnished shall be fully automatic. The term “automatic” is used to define a plant in which:

Batch weights are set manually on a mix selector
Mixes are charged automatically by mix selector
Materials are batched automatically

Ice flaking machine of sufficient capacity shall be installed as a part of batching plant.

Batchers

Individual weigh batchers shall be provided for all works, requiring the use of more than two separate size groups of coarse aggregates. Cumulative weight batchers may be used for work requiring the use of not more than two separate size groups of coarse aggregates provided that the cement is weighed and batched separately from the aggregates. The batchers shall be arranged to permit the convenient addition or removal of material. Batching equipment shall be so constructed and arranged that the sequence and time of discharge can be controlled to produce a re-blending and mixing of the aggregates and, wherever possible, mixing of the cement with the aggregates as the materials pass through the charging hopper in to the mixer. This control shall be effected by the controls of the batcher discharge gates. Batcher controls shall be so interlocked that a new batching cycle cannot be started until all batchers are completely empty.

Weighing Units

Every delivering point of aggregates and cement into the mixer, charging hopper shall have a weighing unit and each weighing unit shall include a visible, springless direct reading dial which shall indicate the scale load at all stages of the weighing operation from zero to full capacity.

The scale dials and the weighing equipment shall be in full view of the operator, so that he may conveniently observe the operation of the batcher gates and the discharge of the materials. Provision shall be made for adjustment and change in weights of materials being charged in the hopper.

Measuring Water

Water shall be measured by weight except in situations for which written approval is given by the Engineer to measure by volume. The mechanism for measuring and delivering water to the mixers shall not permit leakage when the valves are closed.

The filling and discharge shall be measured by weight. The filling shall be capable of ready adjustment to permit varying the quantity of the admixtures to be batched. The equipment shall be kept in a clean and fully operating condition.

Tolerance in Batching

Weighing devices shall be capable of measuring the various ingredients of the following accuracy.

Materials	Percent (by weight)
Cement	1
Water	1

Materials	Percent (by weight)
Aggregate smaller than 40mm size	2
Admixture	1 (or volume)

Records & Charts
An accurate record shall be maintained at the batching plant by the Contractor for the following:

The weight of the cement, water and admixture

The weight of the aggregate for each size shall be recorded separately.

Temperature of the concrete immediately after mixing

Mixing time of each batch when all the materials are loaded into the mixer

Time when the concrete is delivered from the mixer

Ambient temperature

Recorders
A recorder shall be provided for each set of units measuring each of the materials delivered to the mixer. The recorder shall produce a continuous visible record, on a single ruled chart, of the weight of the cement, water and each size of aggregates, of the mixing time of each batch after all materials are in the mixer, of the temperature of the concrete and of the time of day at intervals of not more than fifteen (15) minutes. The recorder shall be completely housed and shall be capable of being locked and shall be placed in a position convenient for observation by the plant operator and the Engineer. Each chart shall be so ruled and printed that it may be readily and permanently identified, so that the quantities and time may be read directly without scaling or calculation. A portion of the recorder chart equivalent to at least thirty (30) minutes of plant operation shall be visible after recording. This portion of the chart shall be supported over its entire width on a smooth, firm backing so that notes can be made without puncturing the paper. The recorders and scale dials shall be housed in a room, box or compartment visible at all times and sufficiently tight to exclude objectionable dust coming from the plant operation.

1900 Structural steel works

1901 General

The fabrication and erection of all structural steelwork shall be under the constant supervision of competent and experienced personnel. All workmanship shall be in accordance with the best modern workshop practice and only skilled workers trained and experienced in steel fabrication and erection shall be employed.

1902 Applicable Standards

The supply, fabrication and erection of structural steelwork shall be in accordance with the provisions of the relevant clauses of the following British Standards:-

BS 4-1:2005 Structural steel sections

BS 4848 Hot rolled structural steel sections

BS 153 Steel girder bridges, part 1- Materials and workmanship and part 2 – Weighing, shipping and erection

BS 4360 Weldable structural steels

BS 4395 High strength friction grip bolts and associated

Parts 1&2 nuts and washers for structural engineering (metric series).

BS 4604 The use of high strength friction grip bolts in structural steelwork.

BS 2708 Unified black square and hexagon bolts, screws and nuts (UNC and UNF threads).

BS 4190 ISO metric black hexagon bolts screws and nuts.

BS 3692 I.S.O metric precision hexagon bolt screws and nuts.

BS 3692 I.S.O metric precision hexagon bolt screw and nuts

BS 4320 Metal washers for general engineering purposes.

BS 5135 Metal arc welding of carbon and manganese steels

BS 638 Arc welding plant, equipment and accessories.

BS 639 Covered electrodes for the manual metal-arc welding of mild steel and medium tensile steel.

BS 4870 Approved testing and welding procedures, part 1 Fusion welding of steel

BS 4871 Approval testing of welders working to approved welding procedures, part 1 Fusion welding of steel.

BS 5493 Protective coating of iron and steel structures against corrosion.

1903 Materials
All structural steel shall be to the Grade as defined on the Drawings and shall comply with the requirements of BS 4360 in every respect Mill certificates shall be supplied to the Engineer in duplicate to confirm the mechanical and chemical properties.

Steel for headed stud shear connectors shall have a minimum yield stress of 385 N/mm² and a minimum tensile strength of 495N/mm².

1904 Storage of Materials
Structural steelwork whether plain or fabricated shall be stored above ground on platforms, skids or other supports and in such way as to prevent pools of water forming on the ground. It shall be kept free from dirt, grease and other deleterious material and shall be protected as far as is practicable from corrosion. The time limits for outside storage of unpainted or primed steelwork shall be as detailed in the Special Specification.

1905 Fabrication
Fabrication shall generally be in accordance with the requirements of BS 153 part 1, workmanship. Rolled material, before being processed, must be straight or flat. Straightening of flattening, where required and where permitted by the Engineer, shall be accomplished by a process not harmful to the material.

The contractor shall submit to the Engineer for his approval two sets of shop drawings with calculations as appropriate and the contractor shall not commence fabrication until written approval has been given by the Engineer. The Engineer will give comment or approval within 28days after receipt of the shop drawings and calculations. Such approval shall not relieve the contractor of any of his responsibilities under the contract.

Following approval of the shop drawings the Contractor shall supply to the Engineer a further four copies of each drawings for the use of the Engineer and the Employer.

The components of various members of the structure shall be placed in jigs of approved design and all welding shall be carried out in accordance with clause 1907. Every precaution shall be taken to prevent distortion.

1906 Preparation of Edges and Ends of Plates
Edges and ends shall be either:

Left as rolled, sawn, machine cut, machine flame cut;

hand flame cut and ground to a smooth profile; or

for stiffeners and gussets not exceeding 12mm thick, sheared and subsequently ground to a smooth profile.

Where ends of stiffeners are required to be fitted, they shall be ground to be in contact with the flanges over 80% of the area of stiffener.

After shearing or flame cutting of plates, one of the following requirements shall be satisfied:

the hardness of the cut edge shall not exceed 350HV 30 of BS 427;

the cut edge is incorporated in a weld;

the material from the edge is removed by machining or grinding to demonstrate that the hardness of the edge is less than 350HV 30 of BS 427;

the edge is softened by an approved heat treatment and is shown to be free from cracks by crack detection procedures; or

the material is Grade 43 steel and is not greater than 40mm thick and the edge preparation is by

machine flame cutting.

1907 Welding
Welding will be permitted only where shown on the Drawings, and the agreed shop drawings.

All welded operations shall comply with the requirements of BS 5135

The details of all welds shall be arranged to achieve the most satisfactory welding procedure. The details of the welding procedure shall be submitted to the Engineer for his approval and no welding may commence without the prior approval of the Engineer. No departure from an approved procedure may be made without prior approval of the Engineer. Welding procedure details to be submitted to the Engineer shall include the following;-

Welded position.
Fusion face preparation
Pre-heating
Electrode make, type and size and mechanical properties
Number and arrangements of runs
Welding current
Arc energy
Method of back gouging and sealing
Proposed methods of quality control and testing of welds

Welding shall be carried out under the supervision of an experienced and competent supervisor in accordance with the requirements of BS 5135. The welders shall be tested in accordance with the requirements of BS 4871 prior to the commencement of the work.

The Contractor shall carry out trials of the welding procedure in accordance with the requirements of BS 4870

Welding plant and accessories shall comply with the requirements of BS 638 and shall be used in accordance with the manufacturer's instructions. The welding plant shall be capable of maintaining at the weld the current and voltage specified by the manufacturer and in accordance with the welding procedure.

The electrodes shall be selected with regard to the quality of the material to be welded and the optimum performance with the welding procedures and shall comply with the requirements of BS 639. All electrodes shall be stored in their original packets in a dry and preferably heated place adequately protected from the weather and shall be handled with care and in accordance with the manufacturer's instructions. Electrodes and fluxes that show signs of moisture, damage or deterioration shall be used.

Welds shall be subject to non-destructive examination and testing as specified in the Special Specification.

Welded fabrications and weld quality shall comply with the requirements of the American Welding Society Specification ANSI/AWS DI.1.81, Section 9,

PART D

Stud shear connectors shall be subjected to the following tests:-

The fixing of studs after being welded in position shall be tested by striking the side of the head of the stud with a 2 kg hammer and shall pass such test if no part of the weld shows fracture or is dislodged thereby

Any stud selected by the Engineer shall be capable of being bent by striking the side of the head of the stud with a 6kg hammer until its head is displaced laterally a distance of approximately 0.25 times the height of the stud from its original position. The stud weld shall not show any signs of cracking or

lack of fusion. Satisfactory studs shall not be bent back again.

Studs whose welds have failed the tests given in (a) and /or (b) above shall be replaced according to a procedure to be agreed with the Engineer

1908 Bolting

Black Bolts
All mild steel bolts, washers and nuts shall be of the grade as specified on the Drawings and shall comply with the requirements of BS 4190, BS 2708 or BS 3692 as appropriate.

All holes shall be drilled or drilled small and reamed and shall be clean cut without torn or rages edges. The holes shall be perpendicular to the member and not more than 2mm larger than the nominal diameter of the bolt.

In all cases where the full bearing area of the bolt is to be developed the bolt shall be provided with a steel washer under the nut to avoid any threaded portion of the bolt being within the parts bolted together. Tapered washers of the correct angle of taper shall be provided under all bolt heads and nuts bearing on beveled surfaces.

High Strength Friction Grip (HSFG) Bolts
HSFG bolts shall comply with the requirements of BS 4395 parts 1 and 2 and shall be used in accordance with the provisions of BS 4604 Parts 1 and 2.

HSFG bolts, nuts and washers shall be supplied cadmium plated to BS 3382 to a thickness marked with a suitable and permanent mark and
the contractor shall obtain the written approval of the Engineer to the proposed marks before commencement of the work.

Each HSFG shall be supplied complete with its nut screwed on. Washers may be supplied on the bolt or separately and bolts and washers shall be packed in the manufacturers works and delivered to site in waterproof containers and stored under cover in these containers until required for use.

The method of tightening HSFG bolts shall be either the part turn method, the torque control method or with the use of load indicating washers in accordance with the following:-

HSFG bolts complying with standard	Permissible methods of tightening
BS 4604 part 1 and 2	1) Part turn for bolts M16 and above Torque control Load indicating washers
BS 4604 part 2 Higher Grade (parallel shank	1) Torque control 2) Load indicating washers

Whatever method of tightening is adopted, the contractor shall supply to the Engineer full details of the procedures to be adopted which shall be in accordance with the requirements of BS 4604, together with details of the tools and equipment he will be using at site and the tests to be carried out to determine the load/ torque/shank tension characteristics of the tools, bolts and the load indicating washers. No bolting shall commence until the Contractor has carried out sufficient site tests to confirm the load/torque/shank tension characteristics of the tools and bolts.

In the case of torque control tightening methods, calibration of the equipment shall be carried out daily before commencing bolting operations in accordance with the requirements of BS 4604.

Where load indicating washers are used they shall be of a type approved by the Engineer and used in accordance with the manufacturer's instructions. The general requirements of BS 4604 shall apply to the assembly and use of HSFG bolts with load indicating washers including check testing to confirm the minimum shank tension is being achieved.

HSFG bolts that have been slackened off after final tightening by any method shall be removed, discarded and replaced.

1909 Transportation Handling and Erection

Erection shall be in accordance with BS 153 part 2, Weighing, shipping and Erection. Structural steel shall be handled with due care at all times and in such a manner as not to cause damage to the steelwork or its protective coatings.

The Contractor shall submit to the Engineer for his approval two sets of drawings and calculations and details showing his proposed methods for transport, handling and erection of structural steelwork including all part, temporary supports and bracings required to ensure stability and safety during erection. The contractor shall erect the steelwork, removed the temporary supports and do all the work required to complete the works in accordance with the Drawings and this Specification. The work shall be carried out in such a manner as will not injure, overstress or disfigure any part of the structure or the foundations and any part injured, overstressed or disfigured shall be removed and replaced or rectified to comply with the requirements of this specification.

The steelwork shall be temporarily erected at the fabrication works and be subjected to inspection by the Engineer before being dispatched to site. Drift pins will be allowed only for bringing together the several parts of the structure, and shall no be used in such a way as to distort the work or enlarge the bolt holes.

Bolts in site connections shall not be finally tightened until sufficient of the structure is properly plumbed, aligned and levelled and no subsequent straining into position will be allowed. Finally, all bolts and connections shall be systematically checked and tightened.

1910 Surface Preparation of Steelwork

Surface preparation of steelwork shall be by blast cleaning in accordance with the requirements of BS 4232, second quality. The maximum amplitude of the blast cleaned surface shall not exceed 0.1mm.

Manual cleaning of structural steelwork including mechanical wire brushing, chipping hammers, vibratory needle guns and the like shall not be permitted except for small parts and then only with the prior written permission of the Engineer.

Surfaces shall be painted with the specified primer paint within four hours of having been blast cleaned.

As soon as the first undercoat has dried, a further stripe coat of paint shall be applied by brush to all edges, corners, and crevices, exposed parts of bolts, rivet head and welds. The stripe coat should have the same specification as the undercoat but be a contrasting shade.

Painted surfaces shall be cleaned of dust immediately prior to the application of further paint. All loose paint, dirt and grit shall be removed and areas contaminated with oil and grease shall be cleaned with emulsion cleaners followed by washing and rinsing with clean fresh water and allowed to dry thoroughly before paint is applied.

In the case of painted steelwork where the interfaces of HSFG bolts are bare steel, the primer coat shall be taken between 10mm and 20mm inside the perimeter of the joint area.

Where paints are to be applied to parent surfaces before making of a joint they shall be stepped back at 30mm intervals commencing at 80mm from welded joints and 10mm from the perimeter of all other joints.

All bolted joints shall be sealed against the ingress of water. Gaps at joints shall be plugged with approved filler and the perimeter of all joints shall be sealed with subsequent coats of paint.

All joints, welds and surfaces affected by welding shall receive the same protective system as applied to the parent surfaces.

Within 14days of a joint being made and accepted by the Engineer, the parent material, exposed parts of bolts, nuts and washers, weld and affected areas shall be prepared and painted.

1911 Painting
All paint used in the works shall be subject to the approval of the Engineer.

All paint shall be supplied from the store to the painters ready for application. Any addition of thinners must be made in the store under the supervision of the Engineer and only as permitted by the manufacturer's data sheet. All the requirements of the manufacturer's data sheet shall be strictly complied with.

Paint shall be applied to surfaces which have been prepared and cleaned in accordance with the requirements of clause 1910

The use of rollers shall not be permitted for the application of paint.

Paint shall not be applied under any of the following conditions: -

When the ambient temperature is less than 4ºC.

When the relative humidity is greater than 90%

During for, rain or mist

When any moisture is present or likely to condense on the steel.

Each coat of paint shall be free from surface defects.

Successive coats of paint shall have different shades for identification.

The contractor shall ensure that the proposed application rates shall enable the specified minimum dry film thickness to be achieved. If the total dry film thickness is less than the specified minimum, an extra finishing coat or coats shall be applied until the specified dry film thickness is obtained.

1912 Paint Systems
The paint system to be used on structural steel work shall be as specified in the Special Specification.

1913 Damaged Surfaces
Any areas of paint which have been damaged following application shall be cleaned down to bare metal and the full specified painting system shall be re-applied. The new paint shall overlap the existing paint by at least 50mm all-round the affected area.

Galvanised surfaces damaged shall be repaired either by the use of low melting point zinc alloy repair rods or powders made specifically for this purpose or by the use of at least two coats of a good quality zinc rich paint to BS 4652

1914 Measurement and Payment
(a) Item: Structural Steelwork
Unit: tonne

Structural steelwork shall be measured by the tonne and shall be the weight calculated from the approved shop drawings excluding bolts, welds, washers and all other fixings required. No deduction shall be made in the measurement for splay cuts, notches and holes providing that the area of each is less than 0.1square metres. No allowances shall be made in the measurement for rolling margin or cutting to waste. The density of steel shall be taken as 7850 kilogremmes per cubic metre.

The rate for structural steelwork shall include for the cost of the following: -

Design, submission of orders, fabrication drawings, details, calculations and certificates.

Provision of all structural steelwork, materials, bolts, nuts, washers, welding rods, and all other fixings; fabrication, including drilling, machining and welding; testing of welds and welders.

Temporary erection at the fabrication works for inspection by the Engineer.

Surface preparation, painting with specified paint system

Inspection, and submission of test reports and certificates

Marking, handling, packing, transporting and storage.

Erection, bolting, welding, including temporary bracings guys, and craneage.

Complying with all the requirements of section 19 of this specification.
1915 Pre-Stress Concrete.
Description.
Shall include Furnish, store, and handle prestressing materials and perform prestressing of precast members and cast-in-place structural units. For this Item, the following definitions apply:

Prestressing. The introduction of internal stresses (pre-tensioning or post-tensioning) into a structural member by tensioning and anchoring strands, bars, or wires to counteract the stresses resulting from the applied load.

Pre-tensioning. The application of prestressing force to the tensioning devices before casting concrete.

Post-Tensioning. The application of prestressing force to the tensioning devices after concrete has hardened.

Tendon. Any single unit used to apply prestressing force to the member. For posttensioned units, a tendon is a bar, group of wires, or group of strands having common end anchorage.

Post-Tensioning System. A complete tendon with couplers, end anchorage, and all other necessary hardware.

Furnish materials that meet requirements of the following Items:
"Concrete Structures"
"Hydraulic Cement Concrete"
"Elastomeric Bridge Bearings"
"Reinforcing Steel"
"Metal for Structures"
"Grouts for Post-Tensioning"
"Joint Sealants and Fillers."

1916 Prestressing Tendons – Materials
Steel Wires and Strands
Steel wires and strands shall comply with BS 5896 and shall be obtained from an organization holding a valid CARES product acceptance scheme certificate of approval for the production of prestressing steel wires and strands (PT6-PT8), or equivalent scheme.

Cold Worked High Tensile Alloy Bar
Cold worked high tensile alloy steel bars for prestressed concrete shall comply with BS 4486 and shall be obtained from an organization holding a valid CARES product acceptance scheme certificate of approval for the production of prestressing steel bars (PT7), or equivalent scheme.

Sampling and Testing
When it is proposed to use other than the lowest strength diameter wire or strand complying with BS 5896, the following shall apply:

(i) A sample shall be taken from each reel of material proposed for use in the works.
(ii) A reel shall only be accepted if both the breaking load and the 0.1% proof load of the sample exceeds the specified characteristic loads given in BS 5896.

The Contractor shall arrange for samples of the steel intended for use in the permanent works to be tested at a testing laboratory appropriately accredited.
Testing of prestressing steel bar, wire and strand shall be performed in accordance with BS EN ISO 15630-3.
1917 Prestressing Tendons - Handling and Storage
Prestressing tendon shall not be mechanically damaged, work-hardened or heated during handling. All prestressing tendons shall be stored clear of the ground and protected from the weather, from splashes from any other materials, and from splashes from the cutting operation of an oxy-acetylene torch, or arc-welding processes in the vicinity.

In no circumstances shall prestressing tendons after manufacture be subjected to any welding operation, or heat treatment or metallic coating such as galvanizing. This does not preclude cutting as described in Clause 1722.

1918 Prestressing Tendons - Surface Condition
Prestressing tendons and internal and external surfaces of sheaths or ducts shall be clean and free from pitting at the time of incorporation in the works. Slight surface rusting is generally acceptable, unless in environmentally severe sites (marine or industrial).

1919 Prestressing Tendons – Straightness
Wire
Low relaxation and normal relaxation wire shall be in coils of sufficiently large diameter to ensure that the wire pays off straight, except that in cases where straight as-drawn wire is not essential, wire in small-diameter coils (corresponding to the diameter of the blocks in the drawing machine) may be used.

Strand
Prestressing strand, however manufactured, shall be in coils of sufficiently large diameter to ensure that the strand pays off straight.

Bars
Prestressing bars as delivered shall be straight. Any small adjustments for straightness that are necessary on Site shall be made by hand. Bars bent in the threaded portion shall be rejected. Any straightening of bars shall be carried out cold but at a temperature of not less than 5°C. Any necessary warming shall be by means of steam or hot water.

1920 Prestressing Tendons – Cutting
All cutting of wire, strand or bar shall be carried out after gradual release of the tension in the tendons to be cut. Cutting shall be executed using either:

a high-speed abrasive cutting wheel, friction saw or equivalent mechanical method at not less than one tendon diameter from the anchor; or
an oxy-acetylene cutting flame, using excess oxygen to ensure a cutting rather than a melting action, not less than 75 mm from the anchor. The temperature of the tendon adjacent to the anchor shall not be greater than 200°C. Neither the flame nor splashes from the cutting operations shall come into contact with the anchorages or uncut tendons.

1921 Prestressing Tendons - Positioning of Tendons, Sheaths and Duct Formers
Tendons, sheaths and duct formers shall be accurately located and maintained in position both vertically and horizontally as shown on the drawings. The position shall be within the tolerances given in sub-Clause 1728.3.

Where tendons are described in the Contract as debonded from the concrete they shall be covered with suitable sleeves. The ends of the sleeves shall be taped to the tendon to prevent the ingress of grout.

Joints in sheaths shall be securely taped to prevent penetration of the duct by concrete or laitance, and ends of ducts shall be sealed and protected after the stressing and grouting operations. Joints in adjacent sheaths shall be spaced at least 300 mm apart.

1922 Prestressing Tendons – Tensioning

General

All wires, strands or bars stressed in one operation shall be taken, where possible, from the same parcel. Each cable shall be tagged with its number from which the coil numbers of the steel used can be identified. Cables shall not be kinked or twisted. Individual wires and strands for which extensions are to be measured shall be readily identifiable at each end of the member. No strand that has become unravelled shall be used. Strands of the same diameter but with different strength grades must not be used in the same beam.

Tensioning Apparatus

The tensioning apparatus shall meet the following general requirements:

(i) The means of attachment of the tendon to the jack or tensioning device shall be safe and secure.

(ii) Where two or more wires or strands are stressed simultaneously, they shall be approximately of equal length between anchorage points at the datum of load and extension measurement. The degree of variation shall be small compared with the expected extension.

(iii) The tensioning apparatus shall be such that a controlled total force is imposed gradually and no dangerous secondary stresses are induced in the tendons, anchorage or concrete.

(iv) The force in the tendons during tensioning shall be measured by direct-reading load cells or obtained indirectly from gauges fitted in the hydraulic system to determine the pressure in the jacks. Facilities shall be provided for the measurement of the extension of the tendon and of any movement of the tendon in the gripping devices. The load measuring device shall be calibrated to an accuracy within ± 2% and checked at frequent intervals. The valid calibration records shall be available on site before tensioning starts. Elongation of the tendon shall be measured to an accuracy within 2% or 2 mm, whichever is the greater.

(v) The tensioning equipment shall be calibrated before the tensioning operation and subsequently at frequent intervals.

Pre-tensioning

Where pre-tensioning methods are used, the tension shall be fully maintained by some positive means during the period between tensioning and transfer. The transfer of stress shall take place slowly to minimize shock.

(i) Straight tendons. In the long-line method of pre-tensioning, sufficient locator plates shall be distributed throughout the length of the bed to ensure that the wires or strands are maintained in their proper position during concreting. Where a number of units are made in line, they shall be free to slide in the direction of their length and thus permit transfer of the prestressing force to the concrete along the whole line. In the individual mould system, the moulds shall be sufficiently rigid to provide the reaction to the prestressing force without distortion.

(ii) Deflected tendons. Where possible, the mechanisms for holding down or holding up tendons shall ensure that the part in contact with the tendon is free to move in the line of the tendon so that frictional losses are nullified. If, however, a system is used that develops a frictional force, this force shall be determined by test and due allowance made. For single tendons the deflector in contact with the tendon shall have a radius of not less than 5 times the tendon diameter for wire or 10 times the tendon diameter for strand, and the total angle of deflection shall not exceed 15°. The transfer of the prestressing force to the concrete shall be effected in conjunction with the release of hold-down and hold-up forces.

Unless otherwise described in contract specific Appendix 1700, concrete shall not be stressed until it has reached at least the age at which 2 test results from specimens taken from it (each obtained from

the average of two test cubes made from one concrete sample) attain the specified characteristic compressive strength at the time when the concrete is subjected to the prestressing force. Testing shall be as described in Annex B.5 of BS 8500-1 and Annex B of BS EN 206-1. The samples shall be taken as described in BS EN 12350-1 and the test cubes shall be made and tested as described in BS EN 12390-2 and BS EN 12390-3 respectively. They shall be cured in similar conditions to the concrete to which they relate. The Contractor shall cast and test sufficient cubes to demonstrate that the required strength of the concrete at transfer has been reached.

Post-tensioning
In addition to the present Clause, the installation of post-tensioning systems shall comply with the requirements of Clause 1711.

(i) Arrangement of tendons. Where wires, strands or bars in a tendon are not stressed simultaneously, the use of spacers shall be in accordance with the recommendations of the system manufacturer.

(ii) Anchorages. Prestressing anchorages for post-tensioning systems shall be in accordance with Clause 7.2 of BS EN 13670 and shall be supplied by organisation certificated with the CARES product acceptance scheme for the Production and Supply of Prestressing Anchorages for Post-tensioning Systems (PT3), or an equivalent scheme. Anchorages shall comply with the minimum performance requirements of BS EN 13391. For each anchorage system used in the works, the characteristic value for anchorage efficiency shall be not less than 95%. Proprietary anchorages shall be handled and used strictly in accordance with the manufacturer's instructions and recommendations.

(iii) Deflected tendons. The deflector in contact with the tendon shall have a radius of not less than 50 times the diameter of the tendon, and the total angle of deflection shall not exceed 15°.

(iv) (05/04) Tensioning procedure. Before tensioning, the Contractor shall demonstrate that all tendons are free to move in the ducts unless the geometry of the ducts makes this impracticable. Tensioning shall be carried out in such a manner that the stress in the tendons increases at a gradual and steady rate. Tensioning shall not be carried out at a temperature below 0°C.

Unless otherwise described in contract specific Appendix 17/4, concrete shall not be stressed until it has reached at least the age at which 2 test results from specimens taken from it (each obtained from the average of two test cubes made from one concrete sample) attain the specified characteristic compressive strength at the time when the concrete is subjected to the prestressing force. Testing shall be as described in Annex B.5 of BS 8500-1 and Annex B of BS EN 206-1. The samples shall be taken as described in BS EN 12350-1 and the test cubes shall be made and tested as described in BS EN 12390-2 and BS EN 12390-3 respectively. They shall be cured in similar conditions to the concrete to which they relate. The Contractor shall cast and test sufficient cubes to demonstrate that the required strength of the concrete at transfer has been reached.

The Contractor shall ensure that those carrying out the stressing are provided with particulars of the required tendon loads, order of stressing and extensions. Allowance shall be made during stressing for the friction in the jack and in the anchorage, although the former is not necessary when using load cells, and for draw-in of the tendon during anchoring.

Stressing shall continue until the required extension and tendon load are reached. The extension shall allow for any draw-in of the tendon occurring at a non-jacking end, but measurement shall not commence until any slack in the tendon has been taken up.

Immediately after anchoring, the forces in the prestressing tendons shall not exceed 70% of their characteristic strength. During stressing the value may exceed 70% of their characteristic strength but shall not exceed 80%.

After the tendons have been anchored, the force exerted by the tensioning apparatus shall be decreased gradually and steadily so as to avoid shock to the tendon or the anchorage. Full records shall be kept of all tensioning operations, including the measured extensions, pressure-gauge or load-cell readings, and the amount of draw-in at each anchorage. When requested copies of these records shall be provided within 24 hours of each tensioning operation.

Tendons shall not be cut within 3 days of their being grouted; however, in the case of deviation from the planned performance during tensioning, cutting of the tendons, grouting and work which can impair the re-tensioning shall not take place until the causes have been investigated and revised tensioning report has been approved.

1923 Prestressing Tendons - Protection and Bond
The prestressing tendons shall be protected in their permanent positions from both mechanical damage and corrosion as described in contract specific Appendix 17/4.

Grout and grouting operations for filling ducts and anchorages of post-tensioned bonded tendons (internal or external) shall be in accordance with Clause 1711.
Grease and wax for the protection of sheaths and anchorages of unbonded tendons shall be in accordance with Clauses 7.2 and 7.6 of BS EN 13670.
Vents, grout inlets and outlets and anchorages shall be sealed to assure corrosion protection equivalent to that provided along the tendon. Anchorage zones shall be protected from drainage water.
Unbonded tendons shall be sealed throughout their length against penetration of moisture.

1924 Payment.
The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Post- Tensioning (Grouted)" or "Post-Tensioning (Un-grouted)." This price is full compensation for prestressing steel, fabrication, transportation, erection, post-tensioning, encasing ducts, grout fittings, grout, end anchorages, bearing plates, equipment, labor, materials, tools, and incidentals.

Materials furnished for testing will not be paid for directly. Post-tensioning of precast concrete members and all pre-tensioning will be measured and paid for as specified.

2000 ROAD FURNITURE

2001 Road Reserve Boundary Posts
The Contractor shall establish a reference point on top of each boundary post.

2004 Permanent Road Signs
Rename the existing text with the heading “2004.1 Posts and Road Signs”

2004.1 Posts and Road Signs
Posts for road signs shall be vandal-proofed by the drilling of 3 mm diameter holes at 100 m centres on alternative sides.

Add the following to this clause:

2004.2 Colour and configuration
The colour, size and location of all traffic signs for the project road shall be as specified on the drawings and in the absence of any details or any missing details, the signs shall be provided as directed by the Engineer.

The sign shall be reflectorized as shown on the drawings or as directed by the Engineer. The signs shall be of retro-reflective type and made of prismatic reflected sheeting fixed over aluminium sheeting as per these specifications.

The cautionary and mandatory signs shall be fabricated through the process of screen-printing. With regard to informatory signs with inscriptions, the message shall be of cut out letters made in the transparent overlay film pasted over the base sheeting with pressure sensitive adhesive or as the base sheeting with pressure sensitive adhesive or as instructed by the manufacturers or as directed by the Engineer.

2004.3 Material
The various materials and fabrication of the traffic signs shall conform to the following requirements:

Concrete
Concrete shall be of the grade shown on the Contract drawings or otherwise as directed by the Engineer.

Reinforcing Steel
Reinforcing steel shall conform to the requirement of the relevant codes as directed by Engineer unless otherwise shown on drawing.

Bolts, nuts, washers
High strength bolts, precision bolts and nuts shall conform to the relevant specifications. The bolts and nuts shall be galvanized (zinc coated, 0.55 kg/m2minimum single spot) and galvanizing shall conform to the relevant specifications.

Plates and supports
Plates and support sections for the signposts shall conform to the relevant specifications. The plates and supports shall be galvanized (zinc coated, 0.55 Kg/m2. minimum single spot.) and galvanizing shall conform to the relevant specifications.

Aluminium
Aluminium sheets used for sign boards shall be of smooth, hard and corrosion resistant aluminium alloy conforming to the relevant specification. The back of the sheet shall be painted with two coats of Epoxy paint.

The thickness of the sheet shall be 3 mm for all types of signs.

2004.4 Structural Details
The structural details for supports shall be as per the Contract drawings and/or as directed by the

Engineer.

2004.5 Retro-reflective Sheeting
General Requirements
The retro-reflective sheeting used on the sign shall consist of the white or coloured sheeting having a smooth outer surface, which has the property of retro-reflective over its entire surface. It shall be unused and shall show no evidence of cracking, scaling, piting, blistering, edge lifting or curling and shall have negligible shrinkage or expansion. A certificate of having tested the sheeting for these properties in an unprotected outdoor exposure facing the sun for two years and its having passed these tests shell be obtained from a reputed laboratory of the manufacturer of the sheeting, for each lot separately.

The reflective sheeting shall be of prismatic lens type OF ASTM - Type-IX.

Lens Type
The retro-reflective sheeting shall be of Prismatic lens type, consisting of cube corner lenses and pressure sensitive adhesive and should be applied to the sign substrate at room temperature of 18 ◦C, transparent, waterproof plastic having smooth surface. The coefficient of retro-reflective as determined in accordance with ASTM Standard E- 810 shall give the minimum values as indicated in table given below.

Minimum Coefficient of Retro-reflection for Retro-reflective sheeting Prismatic Lens Type (candelas/lux/m2)

Obtuse Angle (°)	Entrance Angle (°)	White	Yellow	Green	Red	Blue
0.1	-4	660	500	66	130	30
0.1	30	370	280	37	74	17
0.2	-4	380	285	38	76	17
0.2	30	215	162	22	43	10
0.5	-4	240	180	24	48	11
0.5	30	135	100	14	27	6
1	-4	60	60	8	16	3.6
1	30	45	34	4.5	9	2

When totally wet, the sheeting shall not show less than 90% of the values of retro-reflectance indicated in table above. At the end of 7 years, the sheeting shall retain at least 75% of its original retro-reflectance.

2004.6 Messages and Borders
The messages (legends, letters and numerals) and borders of Cautionary/Regulatory sign boards shall be screen printed. Screen printing shall be processed and finished with materials in a manner specified by the sheeting manufacturer and shall be bonded with the sheeting in the manner specified by the manufacturer.

The messages (legends, letters and numerals) and borders of information signs shall be of cut letters made in transparent overlay film pasted over the base sheeting with pressure sensitive adhesive or as instructed by the manufacturers or as directed by the Engineer.

For screen printed transparent coloured areas on white sheeting, the co-efficient of retro-reflection shall not be less than the values of corresponding colour in the table above.

Cut-out messages and borders, wherever used, shall be made in transparent film applied on base sheeting with pressure sensitive adhesive with the coefficient of retro-reflection which shall not be less than the values of corresponding colour in the table above. For the background colour of the sign the coefficient of retro-reflection shall not be less than that specified in the table above for the respective colours.

2004.7 Colour
The colour shall be as specified and shall conform to the requirements of the table below. Conformance to colour requirements shall be determined spectrophotometrically in accordance with ASTM E 1164, with instruments utilizing either 45/0, or 0/45 illumination/viewing conditions and tolerances as described in ASTM E 1164 for retro-reflective materials.

Conformance to Colour Requirements

The four pairs of chromaticity coordinates determine the acceptable colour in terms of CIE 1931 standard colorimetric system measured with standard illumination source D65. These colours are equivalent to those listed in ASTM D4956 using source C.

								Reflectance		
								Limit (y)		
Colour	x	y	x	y	x	y	x	y	Min	Max.
White	0.3	0.3	0.35	0.35	0.33	0.37	0.28	0.32	40	
Yellow	0.48	0.42	0.54	0.45	0.46	0.53	0.42	0.48	24	45
Red	0.69	0.31	0.59	0.31	0.56	0.34	0.65	0.34	3	15
Blue	0.07	0.17	0.15	0.22	0.21	0.16	0.13	0.03	1	10
Green	0.03	0.39	0.16	0.36	0.28	0.44	0.2	0.79	3	9

The colour shall be durable and uniform in acceptable hue when viewed in daylight or under normal headlights at night.

2004.8 Adhesives
The sheeting/film shall have a pressure sensitive adhesive of the aggressive tack type requiring no heat, solvent or other preparation for adhesion to a smooth clean surface. The adhesive shall be protected by an easily removable liner (removable by peeling without soaking in water or other solvent) and shall be suitable for the type material of the base plate such that it shall not be possible to remove the sheeting from the sign base in one piece by use of sharp instrument. The adhesive shall form a durable bond to smooth, corrosion and weather resistant surface of the base plate. In case of pressure sensitive adhesive sheeting, the sheeting shall be applied in accordance with the manufacturer's specifications.

2004.9 Fabrication
The surface to be reflectorized shall be effectively prepared to receive the retro-reflective sheeting. The aluminium shall be de-greased either by acid or hot alkaline etching and all scale/dust removed to obtain a smooth plain surface before the application of retro-reflective sheeting. If the surface is rough, approved surface primer may be used. After cleaning, the metal shall not be handled, except by suitable device or clean canvas gloves, between all cleaning and preparation operation and application of reflective sheeting/primer. There shall be no opportunity for the metal to come in contact with any contaminants prior to the application of retro-reflective sheeting.

Complete sheets of the material shall be used on the signs except where it is unavoidable. At splices, sheeting with pressure sensitive adhesives shall be overlapped not less than 5 mm. Where screen printing with transparent colours is proposed, only butt jointing shall be used. The material shall cover the sign surface evenly and shall be free from twists, cracks and folds. The transparent overlay film in which cut-out messages have been made shall be bonded with sheeting in the matter specified by the manufacturer.

2004.10 Warranty and Durability
The Contractor shall obtain from the manufacturer a seven-year warranty for satisfactory field performance including stipulated retro-reflectance of the retro-reflective sheeting of Prismatic lens type and that of transparent film and submit the same to the Engineer. In addition, a seven-year warranty for field satisfactory performance of the finished signs with retro-reflective sheeting of Prismatic lens type, inclusive of the screen printed or cut out letters/legends, transparent film and their bonding to the retro-reflective sheeting shall be obtained from the contractor/Supplier and submitted to the Engineer. The Contractor/Supplier shall also furnish a certification that the signs and materials supplied against the assigned work meets all the stipulated requirements and carry the stipulated warranty.

Warranties shall be given in original and shall have legal jurisdiction in Kenya.

Warranties given by power of attorney holders will not be acceptable.

Processed and applied in accordance with recommended procedures, the reflective material shall be weather resistant and, following cleaning, shall show no appreciable discoloration, cracking, blistering or dimensional change and shall not have less than 50 % of the specified minimum reflective intensity values, given in the table under Clause 2004.4 (b) above, when subjected to accelerated weathering for 1000 hours, using type E or EH weatherometer (AASHTO Designation M-268).

2004.11 Installation
Sign posts, their foundation and sign mountings shall be so constructed as to hold these in a proper and permanent position. Sign supports shall be of galvanised structural steel and shall be firmly fixed to the ground by means of properly designed foundation or as shown on the Contract Drawings. The work of the foundation shall conform to the relevant clauses of the Standard Specification.

All components of the signs and supports, excluding the back side of aluminium sheet and the reflective portion, shall be thoroughly scaled, cleaned and galvanised (zinc coated, 0.55 Kg/m2. minimum single spot.) and shall conform to the relevant specifications.

The signs shall be fixed to the posts by welding and/or bolts and washers as shown on the drawing. After the nuts have been tightened, the tails of the bolts shall be furred over with a hammer to prevent removal.

2004.12 Foundation for Support
The foundation for the supports of the sign boards with single support shall be by making excavation in all type of strata to the sizes and level as shown on the relevant drawings and fixed with class 20/20 cement concrete during installation.

The foundation for the supports of the sign boards with two or more supports shall be made by boring holes in all types of strata to the sizes levels as shown on the relevant drawings and fixed with class 20/20 cement concrete during installation. All concrete works shall be carried out as per the relevant specifications.

2004.13 Measurement for Payment
The measurement of standard cautionary and mandatory sign boards shall be in numbers of sign boards supplied and fixed and this shall constitute full payment for the supply of all materials for the sign board and its supports and foundations, fabrication and installation in the ground or embankment as per the specifications. Informatory sign boards with board area exceeding 1.0 m2. shall be measured by area of the reflectorized sheet in square meters.

2004.14 Rate
The Contract unit rate shall be payment in full for the cost of making the road sign including supports and foundations, including all materials, installing it at the site and incidentals to complete the work in accordance with the specifications. In case of overhead sign boards supported on overhead gantry the rate shall not include the support gantry, its foundation and erection which shall be paid separately.

2005 Road Marking
Road marking paints shall be hot applied thermoplastic materials as specified under Clause 219 of the Standard Specification.

2006 Guardrails
Add the following to this clause:

2006.1 Removing, Renovating and Re-erecting Guardrails
Where the existing guardrails have to be removed, or removed and re-erected, or removed, renovated and re-erected, the three processes of removal, renovation and re-erection shall be carried out as follows:

Removing the Guardrails
All guardrails and end units shall be loosened. Posts shall be carefully dug out and the holes shall be filled and compacted in 150 mm layers. Items used for fixing, including bolts, nuts, washers, shall be placed in bags, after which all materials shall be transported to a store approved by the Engineer and all stored in-groups by type.

Where material is intended for re-use, it shall first be unpacked for inspection by the Engineer. The Engineer will decide which material that shall be disposed off if, on inspection it is found unsuitable for re-use.

Renovating the Guardrails
Guardrails and end pieces suitable for re-use shall be taken to the workshop for cleaning and painting. Rust and the existing paint shall be completely removed and minor indentations hammered out. The guardrails shall receive surface treatment in accordance with Clause 2006 of the Standard Specification.

Timber posts suitable for re-use shall be cleaned and treated with an approved timber preservative. Bolts nuts and washers to be re-used shall be cleaned and all dust removed, and shall then be oiled.

Re-erection
The guardrails shall be erected in positions as shown and all the removed materials suitable for re-use and as much supplementary new materials as may be necessary shall be used. Re-erection shall be as specified for new guardrails.

2006.2 Pedestrian Railing
Pedestrian safety barriers shall comply with the requirement of BS 3049. The steel tubing and wire mesh shall be primed with zinc chromate or equal suitable for galvanizing, undercoat and finished with not less than two coats of permanent outdoor enamel of white paint.

2007 Kerbs
Name the existing text with the head as "2007.1 Installation".

Add the following to this clause:

2007.2 Existing Kerbs
Where shown on the drawing or directed by the Engineer, the Contractor shall remove the existing road kerbs and channel, including bed and haunches. Care shall be taken to minimize over break into the existing pavement. The Contractor shall reinstate any over break with a lean concrete or such other materials as may be approved by the Engineer.

2007.3 Repair of Damaged Railing and Kerbs

The repair of damaged railing shall be done by replacement of damaged pipes and posts.

The damaged kerbs shall be repaired by cement mortar.

Materials as per Relevant Codes
Ordinary Portland cement

Coarse aggregate and fine aggregate Tor steel

Water suitable for concreting MS steel sections and pipes

Zinc rich epoxy primer like Nitrozinc primer or any approved equivalent and epoxy coal tar.

Equipment
Welding equipment

Painting/white washing brushes

Other miscellaneous equipment

Procedure
The damaged portion of steel/RCC rating shall be removed up to the unaffected portion of the railing and the parent remaining parts which have to be connected with new components shall be thoroughly cleaned.

In case of RCC railing, the casting of new units shall be carried out by adopting standard practice of construction using all necessary care. The newly constructed RCC components shall be cured as per standard practice of curing by water. The dried up and cured concrete shall be white/colour-washed with proper care to match with the existing colours.

In case of MS pipe railing, the new components or repaired components shall be fixed with necessary care keeping in consideration the alignment and level. The railing components shall then be painted with zinc rich epoxy based primer and finishing with two coats tar epoxy or paint to match the existing colour including cleaning and surface preparations as directed by the Engineer.

The damaged kerbs shall be repaired with cement mortar and the cement mortar shall be cured as per the standard practice. The kerbs shall then be painted black and yellow in alternative bands with reflecting paint of specification and quality approved by the Engineer to give an even shade on work as per the Standard Specification.

2010 Trees

DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI (B32) ROAD:

Add the following to Clause 2010 of the Standard Specification:

2010.1 Plantation of Trees and Hedges

Scope
The work shall consist of:

x Planting of tree saplings in median or other designated locations, and x Planting of hedges within median area.

Materials
Dump Manure

Dump manure shall be of well decayed (at least six months) organic or vegetable matter, obtained in the dry state from the municipal dump or other similar sources approved by the Engineer. The manure shall be free from earth, stone, brickbats or other extraneous matter.

Farmyard Manure

Farmyard Manure shall be well decayed (should be at least 6 months covered in dump), free from grits and any other unwanted materials.

Good Earth

The soil shall be agricultural soil of sandy-loam texture, free from grit, marrum, shingle, stone, brickbats, building rubbish and any other foreign matter. The earth shall be free from clods or lumps of sizes bigger than 75 mm in any direction. It shall have PH value ranging between 6 and 8.5.

Oil Cake (Neem/Castor/Groundnut)

The cake shall be free form bush, dust, grit and any other foreign matter.

Sapling of Trees

The sapling of trees shall be of medium height, leafy type and draught resistant variety native to the area and be of good quality of minimum of 2 m height or caliper diameter of 25 mm as directed by the Engineer.

Sapling of Hedges

The saplings shall be of draught resistant variety normally grown for hedges in the area, approved by the Engineer.

Construction Operations
Tree Planting and Refilling Earth after Mixing with Oil Cake, Manure and Watering

Holes of circular shape of 900 mm diameter and 1000 mm in depth in ordinary soil shall be excavated and the excavated soil, broken to clods of sizes not exceeding 75 mm in any direction, shall be stacked outside the hole. Stones, brickbats, unsuitable earth and other rubbish, all roots, weeds and other undesirable growth encountered during excavation shall be separated out and unserviceable material removed from the site as directed by the Engineer.

Useful material, if any, shall be stacked properly and separately. Good earth in quantities required to replace such discarded stuff shall be brought and stacked at site by the Contractor, with a depth not more than 500 mm from ground level. The pit shall be treated for termite by raking the soil up to 50 mm and treated with 5% Aldrin or Chlordang dust in soil.

The tree hole shall be manured with powdered neem/castor oil cake along with farm yard manure/dump manure screened through 16 mm sieve and these shall be uniformly mixed with the excavated top soil after the manure has been broken down to powder (size of particles not to exceed 6

mm in any direction) in equal proportion. A 2 m high sapling of trees shall be placed at the center of the hole and then the mixture shall be filled into the hole up to the level of adjoining ground and then profusely watered to enable the soil to subside. The refilled soil shall then be dressed evenly with its surface about 50 mm to 75 mm below the adjoining ground level or as directed by the Engineer.

The planting shall be completed soon after completion of the median.

Circular Mild Steel Tree Guard with Bars The tree guard shall be 900 mm in diameter. The tree guards shall be formed of:

3 № 25 mm x 25 mm x 3 mm angle iron verticals 1.95 m long excluding splayed outward at lower end up to an extent of 50 mm

3 № 25 mm x 5 mm MS flat rings fixed as per the design

5 № 1.55 m long 6 mm diameter bars. Each ring shall be in two parts in the ratio of 1:2 and their ends shall be turned in radically for a length of 40 mm at which they are bolted together with 8 mm diameter and 30 mm long MS bolts and nuts.

The vertical iron shall be welded to rings along the circumference with electric plant. 15 № bars shall be welded to rings at equal spacing along the circumferences of ring. The lower end of the angle iron verticals shall be splayed outwards up to an extent of 50 mm. The lower end of the flat of lower ring shall be at the height of 1.95 m. The middle ring shall be in the centre of top and lower ring. The bars shall be welded to the rings as directed by the Engineer. The entire tree guard shall be given two coats of paint of approved brand and of required shade over a priming coat of ready mixed primer of approved brand. The design of the tree guard shall be approved by the Engineer.

Planting of Hedges
The hedges saplings shall be planted in two rows, one each along each edge of the median. Bed for the saplings shall be prepared with necessary manuring, and the live saplings shall be planted in lines parallel to the median edge to the directions of the Engineer. Spacing between saplings in a row shall be such that a thick hedge can be grown, and this shall generally be not farther away than 300 mm.

The planting shall be completed soon after completion of the medians.

Grassing of Median Area
The area of the median between the hedges shall be seeded and mulched to develop grass cover as directed by Engineer.

Maintenance
The saplings of trees and hedges planted shall be watered and maintained by the Contractor till issuance of the final certificate at the end of the Defects Liability Period. This shall also include watering, weeding out of undesirable plants and replacement of dead plant, manuring and trimming of the hedges.

Add the following clauses to this section:

2012 Service Ducts beneath Roads
Where instructed by the Engineer, the Contractor shall construct service ducts beneath the carriageway and shoulders/footpaths. The ducts shall consist of 100 to 300 mm diameter ogee precast concrete pipes surrounded by a minimum of 100 mm thickness of Class 15/20 concrete. The minimum clearance between the road formation and the top of the concrete surround shall be 100 mm.

The ducts shall be provided with draw cords fabricated from strong man-made fibre such as nylon and each duct shall be sealed at each end with a tight fitting plastic plug. In the existing pavement, the duct shall be at least 250 mm below the road surface measured from the top of the concrete pipes and all back filling shall be in
Class 15/20 concrete. The concrete pipes shall conform to the requirements of Clause 215 of the Standard Specification.

2013 Duct Markers

Duct markers shall be installed by the Contractor at each end of the services ducts provided under Clause 2012 above. The duct marker shall be located immediately beyond the outer edge of the shoulder or footpath and as close to the line of the duct as physical constraints permit. Where several ducts are laid side by side, only one duct marker post will be necessary. The duct marker posts shall be constructed as shown on the drawings and shall be clearly and durably marked on the side facing away from the road. The marker shall be inscribed 'X DUCTS' where X is the number of ducts stated in the group marked by the marker posts.

2014 Road Bump and Rumble Strips

Where shown on the Drawings or instructed by the Engineer, the Contractor shall provide, place trim to line and level bumps and/or rumble strips on the carriage way, connecting roads or shoulders. Where instructed, the road bumps shall extend the full width of carriageway and shoulders. The bumps shall be constructed in asphalt concrete to the dimensions shown on the Drawings and to the same standard as the wearing course on the main carriageway.

2015 Bollards

Where shown on the Drawings or instructed by the Engineer, the Contractor shall construct permanent bollards. The bollards shall be precast using a class of concrete as shown on the Drawings.

2016 Retro-Reflective Road Studs

All retro-reflective road studs shall comply with BS 873: Part 4. The Contractor shall submit details of the reflective road studs he proposes to use in the works to the Engineer for approval. The Contractor shall submit also a Certificate of approval from an approving authority. The reflective road studs shall be installed in the locations shown on the drawings or instructed by the Engineer.

2017 Measurement and Payment

Item: Remove existing guardrail

Unit: m
Removal of guardrail shall be measured by the metre as the length of guardrail instructed to be removed, measured between terminal points of the sections removed. The rate shall include for loading, transporting to any point on the site, off-loading and stacking the material and disposing off material unsuitable for re-use.

(b) Item: Renovate and re-erect guardrails

Unit: m
The unit of measurement shall be the length of single guardrail, whether straight or bent, or end pieces renovated as specified. The rate shall include for all works as specified and storage as required. The rate shall also include for erecting the guardrails in accordance with Clause 2006 and any new poles, nuts, bolts and accessories that may be required.

Item: Pedestrian railing

Unit: m
Pedestrian railing shall be paid by the length instructed by the Engineer. The rate shall include for supplying and erection in accordance with the drawings. It shall also include for any bending of end pieces as may be required, disposal of excess materials and tidying up the site after completion of installation.

Item: Service ducts

Unit: m
Service ducts stall be measured by the metre as the length of duct installed as per the Engineer's instructions. The rate shall include for providing all materials, excavation, and installation of concrete pipes with concrete surround, backfilling to formation level, compaction, draw-cords and plugs, all in accordance with Clause 2012 above.

Item: Duct markers

Unit: №
Duct markers posts shall be measured by the number installed. The rate shall include for provision and installation of posts, all excavation and backfill, compaction to the satisfaction of the Engineer and removal of surplus materials.

Item: Bollards

Unit: №
Bollards shall be measured by the number installed. The rate shall include for provision and installation of bollards, all excavation and backfill, compaction to the satisfaction of the Engineer and removal of surplus material.

Item: Reflective road studs

Unit: №

Retro-reflective road studs shall be measured by the number installed. The rate shall include for provision and installation of studs to the manufacturer's recommendations and satisfaction of the Engineer.

Item: Road Bumps

Unit: m3 of each type

2100 MISCELLANEOUS BRIDGE WORKS

2101 Waterproofing to Structures

Add the following to Clause 2101 of the Standard Specification:

For part of the structure in contact with earth, apply one coat of primer before applying two coats of waterproofing material.

The primer shall conform to AASHTO M121-79 (1993). Waterproof cement shall be of proven quality and from a reputed supplier to be approved by the Engineer.

2102 Bridge Bearings

Add the following to Clause 2102 of the Standard Specification:

All necessary tests, methods of installation, and performance guarantee shall be as specified in BS 5400, Part 9.2.

The bearings to be installed by the Contractor may either be supplied directly to the Engineer by the manufacturer or the Contractor is to supply and install the bearings as a part of the Contract. In the former case, the manufacturer shall be associated with the installation of the bearings to the full satisfaction of the Engineer, whereas in the latter case, the Contractor shall be solely responsible for the satisfactory supply and installation of the bearings.

Unit of measurement for Steel Roller and Rocker Bearing, POT and PTFE bearings shall be the number of each type (loads and movement). Unit of measurement for elastomeric bearings shall be in no.

2107 Weep holes

Add the following to Clause 2107 of the Standard Specification:

100 mm diameter PVC pipe of approved quality shall be used for weep holes. In other cases, 75mm with reduced spacing of 1.5m shall be considered, however, this detail indicated in the drawing and conforming to these specifications or as directed by the Engineer.

2109 Methodology for Widening of Existing Bridges

Widening of the existing bridges shall be carried out only on one side. This shall be on the side of the existing bridge away from the proposed new bridge. Foundation and substructure for various components of the widening portion shall be cast against such components of the existing portion. Cut water of the existing piers, wherever present, shall be carefully dismantled without disturbing any other parts of the piers. For widening of the superstructure portion, the existing railing and kerbs towards the side to be widened shall be dismantled. The portion of the deck slab near the region shall be chipped off to expose the slab reinforcement. The existing kerb reinforcement shall be cut and bent so that they are well accommodated within the deck slab and no portion of the reinforcement shall remain exposed after the area is filled with concrete. The deck slab reinforcement of the widening portion shall be lapped with the exposed top reinforcement of the existing deck slab. The chipped of portion of the existing deck shall be filled up with new concrete along with concreting of superstructure of the widening portion.

Before pouring of concrete against the face of the existing structure, the same shall be kept wet with water so as to control absorption of slurry of fresh concrete by the existing structure.

All joints between the existing and new structure shall be properly treated as per the specification and as shown and directed by the Engineer.

While excavating earth close to the existing bridge or chipping/demolishing any of its parts, extreme care shall be taken by the Contractor so that no other part of the existing structure is disturbed or affected due to such breaking works and the existing structure remains safe and sound.

2110 Methodology for Repair and Widening of Existing Bridges

Repair and widening of the existing bridge at a particular site shall be taken up by the Contractor only

after the new bridge at that particular site is constructed and the same can be used by the traffic. Before taking up the works of repair and widening of the existing bridge, the Contractor shall make all arrangement to ensure that both way traffic can use the new bridge and a smooth flow of traffic is maintained. The Contractor shall take all precautions to guard against any accident of traffic due to such diversion and shall use all the necessary road signs for the purpose. After completion of repair and widening of the existing bridge, temporary works carried out for such diversions shall be made good by the Contractor and all arrangements shall be made so that both the old and the new bridges at the site can be used by the traffic.

The Contractor shall prepare a detailed programme of works related to repair and widening of the existing bridges including traffic diversion activities showing dates of commencement and completion of various activities. Such programme of works shall also indicate the status of works for the new bridges.

Repair works for substructure, foundation and abutment which will not affect or disturb the flow of traffic over the existing bridges may be allowed by the Engineer to be taken up before completion of the new bridge. Written approval of the Engineer in this regard shall be obtained.

The Contractor shall get the traffic diversion scheme required for widening of the existing bridge approved by the Engineer and by other concerned authorities/statutory bodies before taking up such works at the site. The Contractor should also put up a scheme for diverting the existing services, if any, supported on the bridge under the widening scope of works.

The Engineer or his authorized representative shall reserve the right to stop any repair or widening or parts thereof if, in his opinion, such works disturb the flow of traffic. No repair or widening works on the existing bridge deck level shall be allowed before the traffic is diverted over the new bridge.

The repair and widening works shall be carried out strictly as per the detailed drawings, specification and as directed by the Engineer. If in the opinion of the Engineer, any such work is not up to the desired standard, the Contractor shall promptly make good such works to the satisfaction of the Engineer or his authorized representative. While carrying out such works, care shall be taken by the Contractor not to damage or disturb any part of the bridge, its approaches or any associated existing works. In case any part of the existing bridge or associated structures is damaged, the Contractor shall promptly repair the same as per the direction of the Engineer or his authorized representative to the satisfaction of the Engineer.

The Contractor shall remove the debris after dismantling works from the site as per the direction of the Engineer or his authorized representative.

After completion of the repair and widening work, the Contractor shall clean the existing structures and the newly widened portion and shall make it good in such a manner that it is traffic-worthy.

2111 Repair of Cracks

Repair of cracks of width more than 0.2 mm shall be carried out by injecting epoxy or cementitious grout in relatively sound concrete.

2111.1 Materials

Epoxy resin like SIKADUR 53 of M/S Sika Qualcrete or Resicrete 21 of M/S Structural Water Proofing Co. India or any other epoxy resin of M/S FOSROC or any other approved equivalent shall be used for repair to PSC/RCC Bridge. Epoxy resins shall generally conform to the manufacturers' specifications. Only such resins having a low shrinkage coefficient, high adhesion strength, water impermeability, high abrasion resistance and good bonding characteristics even in presence of moisture shall be used. Phenolics, polysters and acrylics do not generally satisfy well the above mentioned requirements and shall not be used.

The proposed epoxy resin system shall conform to ASTMC-881-87 and shall conform to the requirements stated in the table below.

Density	1.11 kg/litre
Viscosity at 300C	500 r 50 centipoise
Potlife at 300C	30 minutes minimum
Compressive strength under water (for 14 days) of a 5 cm cube	90-100 N/mm2
Bond strength (14 days)	Concrete failure
Approx. Injection pressure	2 kg/cm2
Shrinkage	Conforming to ASTM C 883

2111.2 Equipment

Injection equipment which should possess the following characteristics is to be used:

Ease of handling, simple function

Low failure rate

Cater for varying viscosity and pot life suited for the job

Capable of injecting into cracks of width ≥ 0.2 mm

Simple cleaning and maintenance routines

Provision of an arrangement for controlling and stopping the injection before the gun is withdrawn

Fitted with pressure gauge to indicate grouting pressure

Materials, equipment and procedure for injection for cementitious grout shall be the same as for polymer modified cementitious (PMC)/grout as indicated in the specification for improving concrete quality.

2111.3 Procedure

Surface Preparation
The visible cracks and other outlet points nearby shall have to be sealed by adopting the given procedure. First of all, the area shall be cleaned thoroughly and all visible outlets shall be sealed. For sealing the cracks, V-notch (20 mm wide x 10 mm deep) shall be cut along the cracks. This shall be cleaned off all loose particles and dust by compressed air. A layer of epoxy bounding agent/PMC slurry shall be applied over the freshly cut surface. Epoxy repair mortar shall be used to fill the groove while the slurry coating is still wet but after a lapse of 30 minutes of the slurry coat. Entry ports for pressure injection shall then be made by pneumatic percussion/rotary drills. In each hole a plastic grouting nipple shall be fixed using epoxy mortar/PMC mortar. The spacing of the ports shall be about 300 mm c/c or be suitable for the site condition. The first and last entry ports should be established at or near the top and bottom respectively of all vertical cracks or at the ends of any horizontal crack.

The spacing of injection points shall be such as to help in maximum resin or cementitious grout material penetration and easy filling of cracks with low operating pressure.

The mixing of various components of epoxy system shall be carried out by mechanical means to ensure thorough and uniform mixing.

The injection shall be carried out from the lower most elevation to the highest elevation to ensure that air or moisture is completely displaced from the cracks and grout materials fills the cracks completely. This is indicated by the flow of grout material noticed at the higher elevation. The rate of grout material injection shall be adjusted so as to fill up all the voids. All inlet points shall be closed by suitable means to ensure that there is no flow back of grout material after the injection has been completed. In case there is no flow from other nipple, the injection should be stopped after it has attained a steady pressure of 2 kg/cm2 for about 5 to 10 minutes.

2112 Repair of Honeycombs and Spalling's
The repair of spalled and honeycombed concrete shall be carried out by low permeability polymer modified cementitious repair mortar.

2112.1 Materials
High early strength Portland cement conforming to IS 8112 shall be used for production of polymer modified cement repair mortar and polymer modified cementitious slurry, which is to be used as a bonding medium with concrete substrate.

The polymer latex which is to be used should consist of water based acrylic polymer and copolymer dispersion and special purpose chemicals. The polymer solid contents shall be 29 to 31 percent. The particles shall be nearly spherical shape with a diameter of 0.30 to 0.40 micrometre. The manufacturer shall certify to the above requirements about solid content and grain size. In order to keep control over the quality, the manufacturer shall provide infrared absorption spectrum analysis for the materials (polymer latex) to be supplied by him. The same material shall also be used for various purposes such as in a slurry form with cement to form a bonding or priming medium, with sand and cement in proportions recommended by manufacturer to form the repair mortar.

No additional water shall be used to prepare the PMC slurry or repair mortar as the water present in the latex is sufficient for cement hydration. The cement/latex ratio shall remain constant for various uses. The sand to be used for constituting the PMC repair mortar shall be silica sand.

The grading of the sand shall be within the limits given in the table below:

BS Sieve Size (mm)	Percentage Passing by weight		
	Coarse	Fine	Combined
10	100	100	100
4.75	95-100	100	98-100
2.36	90-100	100	80-100
1.18	40-60	100	70-80

0.6	0-19	90-100	45-55
0.3	0-4	40-60	20-30
0.15	0-3	0-10	0-5
0.075	3 max	0-3	3 max

2112.2 Repairing Procedure

Preparation of Concrete substrata
All defective areas shall be delineated and marked out on site in conformity with the supervising Engineer's directions.

Concrete on the damaged, loose or honeycombed areas shall be chipped out up to the reinforcement level or up to the level of good parent concrete or up to the point on the reinforcement where the reinforcement is free from corrosion. The chipping of concrete shall continue to expose the full circumference of the steel and to a further depth of 10 mm as directed by the supervising Engineer.

The chipped surface of concrete shall be thoroughly cleaned by wire brush and compressed air to remove all dust and loose materials.

The exposed reinforcement shall be mechanically cleaned of all rust and mill scale.

Priming of Concrete Surface and Reinforcement
Before commencing the application of concrete repair mortar, the prepared concrete substrate shall be thoroughly soaked with water and the free surface water shall be removed before priming.

The well mixed polymer cement slurry (Polymer to cement ratio of 1:2) shall be applied over the well soaked but surface dry concrete and steel bar for adhesion of fresh cement and sand mortar as per the specification and as directed by the Engineer.

Cementitious Repair Mortar
The repair mortar of 1 cement to 3 smooth silica sand shall be applied on the polymer cement slurry in layers of a maximum of 10 mm thickness each and up to a total thickness of 8 mm to 10 mm short of outer surface. The outer surface shall be scarified for good bonding with the next layer.

The polymer modified cement sand mortar in the proportion of 1 polymer to 2 cement to 6 sand shall be applied over the scarified cement sand mortar in maximum of 10 mm thickness and finishing smooth up to the existing surface of concrete as per the specification and as directed by the Engineer.

Curing of the repaired areas with PMC mortar shall be carried out in accordance with the acceptable good practice. However, no curing compound or curing membrane shall be used and curing shall only be carried out by spraying of water or by using wet Hessian cloth.

2113 Repair of Corroded Reinforcement
Repair of corroded reinforcement, where corrosion has reduced the diameter of the bar by more than 20%, shall be carried out by providing new reinforcement which is either welded or firmly secured with the old reinforcement.

2113.1 Material
Steel which is to be used as additional reinforcement, where the diameter of the existing main longitudinal reinforcement has been reduced to 80% of the original reinforcement, should satisfy the requirements of BS or KS. However, the BRC fabric or weld mesh which is to replace/strengthen the corroded stirrups or tie bars should be from reputed manufacturers.

2113.2 Repairing Procedure
The exposed reinforcement showing signs of deterioration by corrosion shall be cleaned by grit blasting.

When corrosion products have been removed, the diameter of the reinforcement shall be measured. If the diameter of the reinforcement is found to be reduced to 80% of the original reinforcement, then

the additional reinforcement of equivalent diameter free from rust shall be firmly secured with the old reinforcement, preferably by welding, if the existing reinforcement can be welded or with a lap of at least 40 times the diameter of the bar.

2114 Expansion Joints

2114.1 Description

This work shall consist of fabrication and placing of expansion joints as indicated on the drawing and conforming to these specifications or as directed by the Engineer.

2114.2 General

The expansion joints shall be designed and duly approved by the Engineer. They shall cater for the expected movement and rotation of the structure at the joints and provide smooth riding surface. They shall also be easy for inspection, maintenance and replacement.

Expansion joints shall be robust, durable, watertight and replaceable. Site fabricated expansion joints shall be prohibited. Expansion joints shall be obtained by the
Engineer either directly or through the Contractor from approved manufacturers and be of proven type.

For bridges with pre-stressed concrete superstructure with individual span length more than 20 m or built with innovative design/construction elastomeric expansion joints of slab seal or strip seal type shall be provided.

For slab type of bridges of spans less than 10 m continuous surfacing may be provided across the expansion gaps, supported on a 20 mm thick plate placed and fixed at the level of the deck slab.

For bridges other than those mentioned above with spans above 10 m, an alternative specification of sliding steel plate joint or filled joints with copper plates may also be adopted if approved by the Engineer, apart from elastomeric expansion joint of slab seal or strip seal type.

Vehicular traffic shall not be allowed over expansion joints after its construction for such period as may be determined by the Engineer.

Proprietary type deck joints offered by the Contractor in lieu of the type specified shall comply in all respects with the manufacturer's specifications and meet the required range of movements and rotations and be fit for the purpose of ensuring satisfactory long term performance in the bridge.

Where alternative type proprietary deck joints are proposed by the Contractor, the following information shall be provided:

Name and location of the proposed manufacturer

Dimensions and general details of the joint including material specifications, holding down bolt or anchorage details and installation procedures

Evidence of satisfactory performance under similar environmental conditions of similar joints being produced by the manufacturer

Any acceptance of alternative types will be at the sole discretion of the Engineer.

Such deck joints shall be installed in accordance with the manufacturer's recommendations and to the general requirements of this Specification.

No expansion joint shall be provided only for the width of the carriageway. It shall follow the profile including the kerb and the footway and facia, if provided. The type of expansion joint for the latter may be made different from that used for the carriageway expansion joint.

2114.3 Requirements

Criterion
The requirement criterion will be separately applicable for the expansion joint proper and the transition zone of attachment to the deck.

Types of Performance
There are two types of performance requirements for the expansion joint proper namely from the necessity of the bridge and from the road users such as man, animal and vehicle.

Performance Requirement with Respect to Bridges
The expansion joint shall:

Withstand the imposed load including the impact load from live load and other sources

Allow expansion and contraction movement due to temperature, creep, shrinkage, prestressing and structural deformations

Permit relative rotation in elevation and plan due to the causes as noted above,

Be waterproof

Bridge deck expansion joint seals play a critical role in preventing the degradation of the structural components of the bridge system. Without effective joint seals, water passes through the bridge deck and works harmfully to corrode steel components and cause deterioration of the concrete. Rainwater gathers various corroding additives from the atmosphere and also from the carriageway.

Ensure sealing
In case bridge deck joints are not sealed, apart from loss of waterproofing, grit and other forms of road debris may enter the joint. Debris, when impacted with the joint can seriously restrict the movement instead of facilitating the same. In the case of proprietary joints being accepted for adoption, the sealing shall be as directed by the Engineer.

Ensure long life by being resistant to corrosion

Be easy to install

Be easy to maintain

Be easy to replace

Replicability of expansion joint shall be one of the basic criteria for selection of the type of expansion joint.

Be resistant to the materials likely to collect/spill over the deck in its normal service.

Performance Requirement with Respect to User
The expansion joint shall:

Provide smooth continuity at the top of the deck for riding comfort

Be of skid resistant surface

Re- non-damaging to the rubber tyre

Make minimum noise during vehicular crossing

Ensure that animal paws and hooves should not get entangled where bridges are used by animal drawn traffic

Permit passing of bullock cart steel tyre for bridges where bullock carts ply, and

Look good aesthetically.

Performance Requirement for Transition Zone
This is the zone of connection of joint assembly and the adjoining deck.

The expansion joint shall:

Permit transfer of generated forces without distress without getting uprooted. The purpose will not be served if the bonding is with the wearing coat only. Anchorage must be provided with the deck structural element.

Ensure that surface in the transition zone stays undisturbed during long term service.

2114.4 Steel Plate Sliding Expansion Joints
In this type of buried joint, the wearing coat shall be made continuous over the joint. The other alternative shall be to keep a gap in the wearing coat which is filled up with a seal and filler, to be provided in extremely hot areas.

Materials for steel plates shall conform to Section 1900 of the Standard Specification. The exposed metallic components shall be galvanized or coated with approved anti-corrosive paint. The thickness shall be 20 mm or so for obtaining satisfactory performance.

Plates shall be placed to the line, grade and expansion gap shown on the drawings with any adjustment required for temperature. Particular care shall be taken with the top of the plates.

Plates shall be firmly held in place during concreting by methods approved by the Engineer.

Any temporary bolts or other fixings, which prevent relative movement of the adjacent parts of the joint, shall be removed as soon as the concrete has set sufficiently to hold the expansion plates in their correct positions. In any case, temporary bolts or other fittings shall be removed within 6 hours of placing concrete unless otherwise directed by the Engineer.

Care shall be taken to prevent damage tt expansion joint plates or its coating. If any damage occurs, the plates and coatings shall be restored by the Contractor to the satisfaction of the Engineer. Plates shall be free of oil, rust, loose paint or other similar material before coating.

2114.5 Filler Joints
The components of this type of joint shall be at least 2 mm thick corrugated late placed slightly below die wearing coat, 2D mm thick compressible board, to protect the edges. Twenty (20) mm thick pre-moulded joint filler shall fill the gap up to die top level of the wearing coat sealed with a joint scaling compound.

The material used for filling expansion joint shall be bitumen impregnated felt, elastomer or any other suitable material, as specified on the drawings. Impregnated felt shall conform to the requirements of IS: 1838, and shall be approved by the Engineer. The joint filler shall consist of large pieces and assembly of small pieces to nuke up the required size shall be avoided.

Expansion joint materials shall be handled with care and stored under cover by the Contractor to prevent damage. Any damage occurring after delivery shall be made good to the satisfaction of the Engineer and at the expense of the Contractor.

Joint gaps shall be constructed as shown on the drawings. Surfaces of joint grooves shall be thoroughly cleaned with a wire brush to remove all loose materials, din and debris, then washed or jetted out.

Pre-moulded expansion joint filler shall not be placed in position until immediately prior to the placing of the abutting material. If the two adjacent surfaces of the joint can to be placed at different times, this type of joint filler shall not be placed until the second face is about to be placed.

Sealants shall be installed in accordance with the manufacturer's recommendations and all appropriate requirements for joint face priming.

Sealants shall be finished approximately 3 mm below the upper surfaces of the joint

Joint materials spilt or splashed onto finished surfaces of the bridge during joint filling operations shall be removed and the surfaces made good to the Engineer's approval.

No joint shall be sealed until inspected by the Engineer and approval is given to proceed with the work.

2114.6 Elastomeric Slab Seal Expansion Joint

Materials
Steel inserts shall conform to IS 226. Use of any other materials like fibre-glass or similar material shall not be permitted.

Elastomer for elastomeric slab unit (ESU) shall be compounded to give hardness IRHD 60 ± 5 subject to the following additional stipulations:

Chloroprene (CR) only shall be used in the manufacture of elastomeric expansion joints. No reclaimed/natural rubber or vulcanized wastes shall be used.

The chloroprene material used in the manufacture of elastomeric (expansion joints) shall be Neoprene WRT, Bayprene 110, Skyprene B5 or Denka S-40V. Chloroprene content of the compound shall not be lower than 60% by weight. The ash content shall not exceed 5 per cent (as per tests conducted in accordance with ASTM D-297.

EPDM and other similar candidate elastomers for expansion joints shall not be permitted.

Elastomeric plugs and spacer bars shall be marked with centre-to-centre distance of fixing holes.

Fixing bolts and nuts shall be made of stainless steel.

Anchor bars comprising hooked anchor stiffeners shall be welded with lower steel inserts and sinusoidal anchor bars shall be welded with horizontal leg of the edge steel inserts. The elaborate anchoring arrangements of steel inserts shall be permanently welded/tied with the steel reinforcement.

Fabrication
Steel inserts shall be grit blasted and provided with epoxy paint. Edges of reinforcing steel sections shall be rounded.
Expansion joints shall be fully moulded to the required size in one single vulcanizing operation including the encasing layers as integral and homogeneous part.

Tolerances of fabrication shall be as follows:

Plan dimension not less than ± 5 mm

Total height not less than ± 3 mm

Supply and Handling
The Contractor shall supply all steel-reinforced elastomeric expansion joints including bolts, nuts, sealant, plugs and all other accessories for the effective installation of the joints including angled jointing sections for kerbs.

Expansion joint material shall be handled with care and stored under cover by the Contractor to prevent damage. Any damage occurring after delivery shall be made good at the expense of the Contractor to the satisfaction of the Engineer.

Installation

Expansion joints
Expansion joints shall be installed as per the approved drawing. Steel inserts, Spacer bars, concreting of pockets, fixing of elastomer slab unit and presetting, shall be carried out as per the following:

Steel Inserts
Deck casting shall be carried out leaving pockets or recess for steel inserts and anchors of the expansion joint as per the drawings.

Steel inserts shall be lowered at the appropriate location inside the pocket.

The top of the hum shall be flush with the finished level of wearing course maintaining the camber.

Spacer bars, duly set appropriately to the month of installation, shall be fitted under strict supervision.

Anchor rods shall be tied/welded with the existing deck main reinforcement maintaining level and alignment.

Welding between anchor rods mid deck reinforcement is preferable. If welding is not possible, strong steel tie wires shall be used for fastening, under strict supervision.

Spacer Bar
Spacer ban shall be used to ensure proper positioning of bolts and also levelling of the steel inserts during fixing of the same with the deck reinforcement and casting second stage concreting in the pocket thereafter.

The second stage concreting operation shall preferably be started within 24 hours of fixing the steel inserts. In such cases, spacer bars should be removed just after concreting is finished. If there is a substantial time lag between fixing of inserts and concreting, then any one of the following methods shall be adopted, depending on the support condition.

For simply supported bridge resting on simple elastomeric bearings, (with no dowel pins), insert shall be placed in position with spacer bars at every alienate joints. Such joints shall be called restrained joints. In other words, inserts shall not be fixed simultaneously at two ends of one span. If the above condition is satisfied, inserts with spacer bars shall be kept in position for a substantially longer period at such restrained joints. Spacer bars shall be removed after concreting of such restrained joints and inserts placed in position with spacer bars at the other unrestrained joints thereafter.

For bridges resting on other than elastomeric bearings (including bearings with dowel pins at one end), after placing and aligning the inserts and securing the same, the spacer bars shall be removed.

Concreting shall be carried out with great care so that inserts are not dislocated or distorted.

While removing the spacer bar after concreting, one must take care to see that the concrete is not damaged during withdrawal of spacer bar. If the spacer bar happens to be snugly and fined, it shall riot be pulled by any means; it shall be gas cut in two pieces and then removed.

Concreting of Pocket
Concreting of pocket shall be done with great care using proper mix conforming to grade similar to that of the deck casting besides ensuring efficient bonding between deck and steel insert. Also proper care shall be taken for ensuring efficient bonding with the already cast concrete.

Needle vibrators shall be used. Care shall be taken so that the position of steel insert is not disturbed during vibration.

Spacer bar shall be removed within an appropriate time before the joint is required to permit movement.

Fixing of Elastomeric Slab Unit (ESU)

Special jig shall be used to preset the ESU during installation.

ESU (mounted on the jig, if preset) shall be lowered to position.

The line and level on the ESU should be adjusted.

ESU shall be removed and mid coated with special adhesive.

ESU shall be placed in position again, ensuring waterproof joining at the required faces.

ESU shall be tightened with stainless steel n9ts and lock washers in position. Tightened nuts shall be locked with lock washers.

Special sealant shall be poured inside the plug holes.

The elastomeric plugs shall be pressed in position after applying adhesive on the appropriate surface.

ESU shall be fined in position after completion of wearing course. While completing this part of the wearing course, adequate care shall be taken to ensure that a waterproof is joining with the already existing wearing course.

Pre-Setting
The main purpose of presetting Deformation of superstructure and substructure, if any.

Resultant changes in expansion gap due to first factor can occur in both directions from any, pre-selected mean position whereas changes due to creep and shrinkage are unidirectional such that the expansion gap continuously increases with passage of time.

The steel insert unit of expansion joint can be fixed in any month of the year. As stated earlier, the expansion gap between the bridge superstructure may vary from time to time; hence the initial fixing distance between fixing points will obviously depend on the month of installation of steel insert. The centre to centre distance between stainless steel fixing of bolts as indicated in the drawing can be taken as only nominal. Presetting depending on this shall modify the same.

The difference between the mean temperature of the month of fixing of steel insert and the annual average temperature.

The elapsed period between the casting and/or prestressing and fixing of steel insert for calculating the remnant creep and shrinkage.

of the steel inserts at the time of its installation is to ensure as closely as possible the condition that in the run at the mean average annual temperature, the ESU remains at its nominal state.

Major factors responsible for changing the longitudinal length of the bridge superstructure are indicated below.

Temperature variation from annual mean.

Changes due to shrinkage of concrete.

Changes due to elastic shortening and creep of the prestressed bridge superstructure.

Special requirements for installation
Prior to construction of bridge deck area adjacent to the joint the supplier shall provide detailed working drawings showing the location of all bolts, recesses and holes necessary for the installation of the joint.

Reinforcing bars in superstructure shall be amended as required to ensure that there will be no interference in the installation of the joint.

All hearing surfaces and recesses which are in contact with the joint assembly shall be checked with a straight edge to ensure flatness of profile.

No holes shall be drilled for fixing bolts within 7 days of concreting. Holes for the bolts shall be drilled to the size and depth shown on the drawings.

Sections of the jointing making the completed joint shall follow a straight line.

The fixing bolts shall not be placed in a position until at least 4 weeks after stressing is completed in post-tensioned box or beam and slab structures. Prior to placing sections of jointing, contact surfaces shall be cleaned to remove all grease, tar, paint, oil, mud or any other foreign material that may affect adhesion of the sealant.

Sealant shall only be applied to dry contact surfaces. Sufficient sealant shall be applied to the contact surfaces to cause extrusion of sealant when the jointing is fixed in position.

Final sealing of the finished expansion joint shall be completed immediately after completion of installation. All exposed ends, joints between units and other areas of possible leakage shall be filled with sealant. All voids between the sides of the jointing and concrete or plates shall be filled with sealant.

Bolt cavities shall be cleaned and plugged with neoprene cavity plugs. Prior to placing the plugs sufficient sealant shall be placed in the cavities to cause extrusion of the sealant by the plugs.

All excess sealant shall be removed from the jointing and adjacent arm.

Acceptance Test
Quality Control

The necessary quality control certification by the manufacturer in regard to properties of Elastomer and steel shall be furnished.

For severe environment, ozone resistance test shall be carried out for elastomer.

Fabricated Expansion Joint

The fabricated expansion joint shall be subjected to the following acceptance tests:

Routine test: each expansion joint shall be tested for at least 100 cycles for a test movement, which shall be two percent more than the design expansion/contraction movement

In addition to routine test, one out of every 20-expansion joints shall be subjected to the test movement for 4000 cycles.

The lot shall be rejected if the elastomer material shows signs of fatigue or permanent set or distress in the test. The test piece shall not be used in the bridge.

The type of test for abrasion resistance shall be carried out for one joint out of every 20 № as per the BS and the standard deviation shall be within ± 20 %

It should be noted that the manufacturer shall preferably have in-house testing facility. Otherwise, the testing shall be carried out by him at his expense at any testing establishment selected by the Engineer. A manufacturer who cannot carry out the acceptance test shall not be entitled to supply elastomeric slab seal joint.

2114.7 Strip Seal Expansion Joint

Components
Strip seal expansion joint shall comprise the following items:

DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI (B32) ROAD:

Edge bums

This special claw leg profiled member shall be of extruded rolled steel section combining good weldability with notch toughness.

Strip seal

This shall be of chloroprene with high tear strength, insensitive to oil, gasoline, and ozone. It shall have high resistance to aging. This components, provided to ensure water tightness, shall have bulbous shape of the pan of the seat which is inserted into the groove provided in the edge beam. The seal should be vulcanised in single operation for minimum full length of joint.

Rigid Anchorage

This shall be welded to the edge beam at staggered distances.

Anchor loops

This shall be made of weldable steel connecting the rigid anchorage with deck reinforcement.

Material

The steel shall conform to steel grade RST 37-2 of German Standard or equivalent.

Strip Seal Element Specification

Sealing element is made of chloroprene and must be an extruded section. The working movement range of the sealing element shall be at least 80mm with a maximum of 100 min at right angles to the joint and ± 40 mm parallel to the joint.

PROPERTY	Oil(116 h/25 per cent C) ASTM Oil № Volume Change
Hardness	Change in hardness
Tensile Strength	
Elongation at fracture	ASTM Oil № 3
Tear Propagation	Volume Change
Strength	Change in hardness
Longitudinal	
Transverse	Cold Hardening Point
Shock Elasticity	
Abrasion	

PROPERTY	
Residual Compressive Strain (22 h\70 C/360 per cent strain)	
Ageing in hot air (14 days/70 deg C)	
Change in hardness	
Change in tensile Strength	
Change in elongation at Fracture	
Ageing in ozone (24 h/50pphm/25 deg C/20 per cent strain)	
Swelling behaviour in	

SPECIFIED VALUE

63 ± 5 Shore A
Min 11 MPa
Min 350 %

Min 10 N/mm
Min 10 N/mm
Min 25 %
Min 225 mm^3

SPECIFIED VALUE

Max 28 %

Max+5 Shore A
Max -20 %
Max -20 %

No Cracks

Max 5 %
Max 10 Shore A

Max 25 %
Max 20 Shore A

Min -35 °C

Fabrication (Pre- installation)
Rolled steel profiles for edge beams shall be long enough to cater for a 2-lane carriageway. These shall be cut to size of actual requirements by means of a metre box saw. Alignment of the cut-to-size steel profiles shall then be made in accordance with the actual bridge cross-section on worktables. For this purpose, the contour of bridge cross-section shall be sketched onto these tables. After the steel profiles are aligned, they will be chucked to the tables by means of screw clamps and tacked by arc welding.

Anchor plates shall be cut to the required size by gas cutting. These shall be welded to the edge beams.

Anchor loops shall be bent to the required shape and welded to anchor plates.

The finally assembled joints shall then be clamped and transported to the work site.

Handling and Storage
For transportation and storage, auxiliary brackets shall be provided to hold the joint assembly together.

The manufacturer shall supply either directly to the Engineer or to the Bridge Contractor all the materials of strip seal joints including sealants and all other accessories for the effective installation of the/jointing.

Expansion joint material shall be handled with care. It shall be stored under cover on suitable lumber padding by the Contractor to prevent damage. Any damage occurring after delivery shall be made good at the Contractor's expense to the satisfaction of the Engineer.

Installation

Gap Width
The width of the gap to cater for movement due to thermal effect, prestress, shrinkage and creep, superstructure deformations (if any) and substructure deformations (if any) shall be determined and intimated to the manufacturer. Depending upon the temperature at which the joint is likely to be installed, the gap dimension shall be preset.

Movement of Joint
Taking the width of gap for movement of the joint into account, the dimensions of the recess in the decking shall be established in accordance with the drawings or design data of the manufacturer. The surfaces of the recess shall be thoroughly cleaned and all dirt and debris removed. The exposed reinforcement shall be suitably adjusted to permit unobstructed lowering of the joint into the recess.

Recess
The recess shall be shuttered in such a way that dimensions in the join drawing are maintained. The formwork shall be tight.

Joint Placing
Immediately prior to placing the joint, the presetting shall be inspected. Should the actual temperature of the structure be different from the temperature provided for presetting, correction of the presetting shall be done. After adjustment, the brackets shall be tightened again.

Joint Lowering
The joint shall be lowered in a pre-determined position. Following placement of the joint in the prepared recess, the joint shall be levelled and finally aligned and the anchor loops on one side of the joint welded to the exposed reinforcement bars of the structure. Upon completion, the same procedure shall be followed for the other side of the joint. With the expansion joint finally held at both sides, the auxiliary brackets shall be released, allowing the joint to take up the movement of the structure.

Concrete Quality
High quality concrete shall then be filled into the recess. The packing concrete must feature low shrinkage and

have the same strength as that of the superstructure, but in any case, not less than concrete Class 40 Good compaction and careful curing of concrete is particularly important. After the concrete has cured, the movable installation brackets still in place shall be removed.

Strip Seal
Rolled up neoprene strip seal shall be cut into the required length and inserted between the edge beams by using a crow bar pushing the bulb of the seal into the steel grooves of the edge beams. A landing to a bead shall be formed in the thickened end of the edges of the seal which would force the thickened end against the steel beam due to wedge effect when the strip seal is buttoned in place.

Seal Protection
As soon as the concrete in the recess has become initially set, a sturdy ramp shall be placed over the joint to protect the exposed steel beams and neoprene seals from site traffic. Expansion joint shall not be exposed to traffic loading before the carriageway surfacing is placed.

Carriageway Surfacing
The carriageway surfacing shall be finished flush with the top of the steel sections. The actual junction of the surfacing/wearing coat with the steel edge section shall be formed by a wedge shaped joint with a sealing compound. The horizontal leg of the edge beam shall be cleaned beforehand. It is particularly important to ensure thorough and careful compaction of the surfacing in order to prevent any premature depression forming in it.

Acceptance Test
All steel elements shall be finished with corrosion protection system.

For neoprene seal, the acceptance test shall conform to the stipulated requirements. It shall also be stretch tested. If a manufacturer is to supply this type of joint, he will have to produce a test certificate accordingly conducted in a recognized laboratory in Kenya or abroad.

In view of the importance of the built up edge beams, special investigation of fatigue strength of this section with anchorages to withstand 2 x 106 load change cycles without showing sips of damage, will be required. The supplier shall have to produce a test certificate in this regard conducted in a recognised and competent laboratory in Kenya or abroad.

The manufacturer shall produce test certificates indicating that anchorage system had been tested in a recognized laboratory to determine optimum configuration of anchorage assembly under dynamic loading.

The manufacturer shall satisfy the Engineer that water tightness test for the type of joint has been carried out in a recognized laboratory to check the water tightness under a water pressure of 4 bars.

As strip seal type of joint is specialized in nature, generally of the proprietary type, the manufacturer shall be required to produce evidence of satisfactory performance of this type of joint.

Tests and Standards of Acceptance
The materials shall be tested in accordance with these specifications and shall meet the prescribed criteria.

The work shall conform to these specifications and shall meet the prescribed standards of acceptance.

Measurements for Payment
The expansion joint shall be measured in running metres. For filled joints, the rate per running metre shall include the cost of sealant for the depth provided in this drawing.

Rate
The contract unit rate shall include the cost of all material, labour, equipment and other incidental charges for fixing the joints complete in all respects as per these specifications in the case of the Contractor supplying the expansion joint. If the manufacturer supplies the expansion joint directly to the Engineer, the cost of installation,

handling and fixing shall be borne by the Contractor.

2115 Repair of Expansion Joints

The expansion joints shall be repaired by cleaning the muck filled up in the expansion joints and for preventing any further filling up of the joints and subsequent non-functioning of the joints. The joints shall be improvised as shown on the drawings.

2115.1 Materials

Structural steel conforming to BS Codes
Fe 415 HYSD bars conforming to BS Codes
Compressible fibre board
Polysulphide Sealant
Ordinary Portland Cement conforming to KS 1825
Aggregates conforming to BS
Water conforming to the specifications in BS
Epoxy bonding agent like FOSROC's Nitobond EP or any approved equivalent.

The epoxy bonding agent shall conform to ASTMC-881-89 or equivalent and shall also conform to the following requirements:

(i)	Density	:	1.3 kg/litre, approximately
(ii)	Pot life	:	at least 45 minutes at 300C
(iii)	Compressive strength	:	50 N/mm2
(iv)	Flexural strength	:	30 N/mm2
(v)	Tensile strength	:	25 N/mm2

2115.2 Equipment

Welding Equipment

Vibrators

Concrete mixing machines

Other general tools used in construction.

2115.3 Procedure for Repair

The bituminous wearing course and RCC/PCC wearing course near the expansion joints shall be removed by jack hammer or any suitable means as shown on the drawings and the muck shall be disposed off as directed by the Engineer.

The expansion joint and the adjoining structural concrete shall be cleaned of all dust, muck and any deleterious material. For removing the muck from the expansion joint, water jet may be applied from both top and bottom.

The structural steel shall be cut and welded as shown on the drawings and to the profile of the road cross section. The structural steel shall be painted for rust protection.

2116 Fixing Dowel Bars in Concrete

2116.1 Scope

The work shall consist of fixing HYSD bars in the existing concrete deck slab/other concrete components to facilitate bonding of a structural component with an existing one.

At least 14 days before start of the work, the Contractor shall furnish detailed methodology of construction including sources of supply of material, tools, equipment and appliances to be used on work, details of personnel

and supervision.

The Contractor's personnel shall be qualified and experienced in repair and rehabilitation work of such nature.

2116.2 Materials
HYSD bars shall conform to BS.

The grout material used for fixing HYSD bars in drilled holes in concrete shall be obtained from a reputed manufacturer and grout mix shall be prepared in conformity with the manufacturer's recommendations. The material shall be either of the following:

Two/three component low viscosity epoxy resin system, having required characteristics of bonding with concrete and resistances to moisture penetration (Resicrete 21 or Resicrete 212 of M/S Structural Waterproofing Co. or SIKADUR BTP of M/S Sika Qualcrete or equivalent).

Cement grout in powder form consisting of cement, good quality sand and admixtures when mixed with required amount of water forms a pourable mix to be used for bonding HYSD bars in concrete (EXCEM – E1 manufactured by M/S Structural Water Proofing Company or M/S SIKADUR or equivalent).

The epoxy resin system shall conform to BS.

The cement grout shall basically be shrinkage compensated, chloride free and of very high strength (50 MPa at 28 days). The mix should be capable of pumping or pouring and shall have excellent bond strength with concrete and steel (bond strength of 15 MPa with HYSD bars at 28 days).

2116.3 Construction Operations
The construction operation shall be in the following sequence, and shall be supervised by the Contractor's key personnel well experienced in such works:

Drill holes of required diameter and depth at desired locations as shown on the drawings.

Clean the hole with air blast through air nozzle of 6-mm dia. connected to air compressor to remove the drilled powder, which may remain inside the drilled hole.

Mix the required quantity of grout so that the work could be completed within the normal setting time as specified by the manufacturers.

Pour required quantity of mixed grout in the holes.

Insert the dowel rod in the hole where grout has been placed. Move the rod up and down several times to drive out entrapped air, if any.

Allow the curing time as per manufacturers specifications.

Inclined dowels shall be straightened to match their intended profile only after the grout has finally set and required strength has been achieved.

2116.4 Measurement for Payment
Measurement for fixing HYSD bars in concrete involving drilling in concrete and fixing HYSD bar with suitable fixing agent shall be measured in number of such HYSD bars fixed in position.

2116.5 Rate
The Contract unit rate for fixing of HYSD bars in the existing concrete slab/other components shall include cost of all material, labour, tools and plants, drilling required diameter hole in concrete, placing in position, temporary works, testing and curing and other incidental expenses for the satisfactory completion of the work as per the

specifications.

2117 Drilled Cast-In-Place Concrete Piles

2117.1 General

The work shall include drilling the holes as required, supplying and placing the steel casing pipe and reinforcing steel, and supplying, placing, protecting and curing the concrete.

2117.2 Equipment and Drilling Methods.

Due to the special nature and handling of the work, it requires that the drilling contractor to have adequate equipment and a proven record of competence in this work. All pile drilling equipment, drilling methods and procedures shall be reviewed and approved by the Engineer before drilling activity commences. Unless otherwise specified only powered Pile Drilling Equipment shall be accepted.

screw rotary type augers, hydraulic oscillating equipment shall be preferred equipment, however with proper protective mechanism in preventing collapse, wash boring powered percussion drilling shall be considered.

2117.3 Pile Drilling Plan

The Contractor shall have demonstrated experience related to the successful completion of projects with similar scopes of Work and ensure that the equipment used is in adequate in quantity, quality and in good operating condition.

A pile drilling plan shall be submitted by the Contractor to the Engineer a minimum of 2 weeks prior to the commencement of pile installation for review and approval. At a minimum, the following information shall be contained in the pile drilling plan:

Summary of Contractor's experience related to the project scope of work;

Specifications, setup and configuration of piling equipment;

Drilling methods, procedure and drilling sequence (including methodology to address the presence of boulders, hard rock stringers, or occurrences of pile wall sloughing and/or ingress of water);

List of drilling tools and attachments for belling(bulb) and cleaning;

List of proposed casing lengths and diameters to be available on site;

Methods to install and remove temporary casing.

Sump bentonite slurry management strategy.

Sample piling monitoring records.

2117.4 Drilled Pile Installation

Drilled pile holes shall be stabilized and sealed by means of temporary casings to prevent the possible collapse of the pile holes or ingress of water. The Contractor shall make every attempt necessary to obtain dry pile holes prior to placing pile concrete. At a minimum, the Contractor shall have on site casings of appropriate size and lengths, bailing buckets, final cleanout buckets and water pumps ready for use in the Work. A drilled pile hole will be considered dry when the seepage rate into the drilled pile hole is less than 300 mm per hour and the water can be controlled by pumps or other means to reduce the depth of accumulated water to 75 mm or less at the time of concrete placement.

Seepage water removed from pile holes shall be managed in compliance with all environmental regulations by discharging it into settlement tanks or ponds, hauling and disposing offsite, or other methods acceptable to the Engineer. A seepage water management strategy shall be included in the Contractor's Environmental management plan and submitted with the pile drilling plan.

Temporary casings, if used in drilling operations, shall be removed from the hole by vibration or hydraulic oscillation and of sufficient strength to withstand repeated use and any forces required to install or retrieve it. The internal diameter of casings shall be the same size as the specified pile diameter and of sufficient length to permit drilling operations to proceed unimpeded. The bottom of the casing shall be maintained sufficiently below the top of the concrete during withdrawal and placing operations.

Where belling (bulb) of the piles is specified, belling shall proceed only after the pile hole has been drilled to an elevation acceptable to the Engineer. The walls and bottoms of the pile holes shall be cleaned to remove all loose and extraneous material.

Pile reinforcement and pile concrete shall not be placed without approval of the depth of pile holes by the Engineer.

2117.5 Reinforcing Steel

Reinforcing steel shall be fabricated, shipped, handled, stored, placed, fastened and spliced in accordance with these specifications & Reinforcing curtailment as shown on the Drawings.

Reinforcing steel shall be positioned and braced to achieve placement tolerances as specified. Shoes or spacers shall be firmly attached to the reinforcement to ensure the reinforcement is kept in position during concrete placement and cover requirements are met.
Projecting reinforcing steel shall be located such that it is within a tolerance of ± 10 mm or as determined by the Engineer.
2117.6 Pile Concrete.
Pile concrete shall be placed by means of a funnel equipped with a centre chute drop tube. The chute drop tube shall be a minimum of 200 mm in diameter with a maximum drop height of 1.5m. Pile concrete shall be self-compacting at time of discharge. For under water concreting, special concrete mix design shall be approved by the Engineer
2117.7 Pile integrity testing. (PIT)
The pile Integrity refers to ascertain characteristics of the piles such as:
Physical Dimensions of Pile (Length or Cross-Section);
Continuity of Pile (presence of Voids or Major Cracks); and
Consistency of the Pile Material.
Either of the following NDT shall be adopted in the integrity testing:
Low-Strain Pile Integrity Test
Cross-hole Sonic Logging
Thermal Integrity Test.
2117.8 Pile Capacity Testing and Reporting
Static Load Testing
Static Load testing shall be carried out by an independent testing agency specializing in this type of Work. The independent testing agency shall be engaged by the Contractor and supply and install all testing equipment and analyze the test results in accordance with this specification. The Contractor shall be responsible to coordinate and manage all associated static load testing activities.
Static load testing and reporting shall be completed in accordance with British Pile testing standards for piles subjected to axial loads and as outlined in the Contract documents. As a minimum, the report shall include the following:
Site plan showing locations of test pile and nearest test holes;
Test hole logs and summary of subsurface conditions;
Type and dimensions of test and anchor piles;
Test pile material including basic specifications;
Pile installation details;
Final pile top and tip elevations;
Ground surface elevation;
Date and type of load test;
Temperature and weather conditions during the test;
Description of instrumentation used to monitor pile performance during testing including their locations;
Description of test setup and testing procedures;
Tabulation of time, load, and displacement readings;
Interpretation and analyses of test results including failure load and the criterion used to estimate it, shaft friction, and end bearing resistance (as applicable);
Pile load-movement curve; and
Pile time-load and time-movement curves.
The static load test report shall be submitted to the Engineer for review and acceptance within 7 days of completion of testing.
High strain dynamic loading may be proposed by the Contractor in substitution for static load testing.
High Strain Dynamic Load Testing - Pile Driving Analysis (PDA Testing)
PDA testing shall be completed by an independent testing agency that has specialized in this type of Work. The independent testing agency shall be engaged by the Contractor and supply and install all testing equipment and analyse the test results in accordance with this specification. The Contractor shall be responsible to coordinate and manage all associated PDA testing activities.
The Contractor shall provide the Enginner a minimum of two weeks advance notice of any scheduled PDA testing.
2117.9 Testing Requirements

PDA testing shall be completed in accordance with British Pile testing standards for piles subjected to axial loads. The impact device used for PDA testing shall be acceptable to the Engineer and capable of mobilizing the ultimate pile capacity in a single blow without additional data interpretation.

2117.10 Reporting Requirements

The independent testing agency shall provide a daily field log to the Engineer within 24 hours of testing, summarizing preliminary test results including driving stresses, transferred energy and estimated pile capacity. Upon review of the daily field log(s), tip elevations may be revised by the Engineer.

The independent testing agency shall also provide a summary letter report that includes complete PDA test results and analysis for the pile tested the summary letter report(s) shall be prepared these specifications. As a minimum, the summary report shall include the following:

Pile and driving system information;
Pile installation data;
PDA testing equipment and procedure;
Energy imparted;
Maximum driving stresses;
Hammer blow rate;
Signal matching input parameters including quake and damping factors; and
Shaft friction, end bearing and total pile capacity.

2117.11 Measurement and payment

Item: R.C concrete bored and cast in place.

Drill Rig setup: Payment will be made at the unit price bid per pile for “Drill Rig Set-up”, for each specified type and size of drilled pile, and will be full compensation for setting the equipment over the pile ready to commence drilling; supply, installation and removal of temporary casings; and all labor, equipment, tools and incidentals necessary to complete the Work to the satisfaction of the Engineer.

Item: Pile installation on the bored hole.

Measurement for payment of pile installation will be by the meter of drilled piles acceptably installed, measured to the nearest 0.1 m.

The quantity paid for will be the actual measured length from the pile tip to the underside elevation of the pile cap or abutment seat, as applicable.

Payment will be made at unit price bid for “Pile Installation”, for each specified type and size of drilled pile, and will be full compensation for drilling pile holes to the elevations and dimensions shown on the Drawings; supply and installation of the Reinforcement steel cage and concrete, if specified; dewatering through provision of a sump with bentonite for wall strengthening and cleaning of pile holes as required; and all labor, equipment, tools and incidentals necessary to complete the Work to the satisfaction of the Engineer.

All costs associated with Cross-hole Sonic Logging and any associated repair work required will be considered incidental to the Work, and no separate or additional payment will be made.

Static load testing/High strain Dynamic load test.

Payment for static load testing or dynamic load testing will be made at the unit price bid per test for and will be full compensation for all labor, materials, equipment, tools and incidentals necessary to complete the testing to the satisfaction of the Engineer.

Pile integrity Testing.

Payment for Pile integrity testing through low strain shear will be made at the unit price bid per test and will be full compensation for all labor, materials, equipment, tools and incidentals necessary to complete the testing to the satisfaction of the Engineer.

2200 DAY WORKS

2201 Scope
This specification covers instructions that may be issued by the Engineer as additional or substituted work to be executed on a day work basis by the Contractor or by his sub-contractors.

2202 Standards
All codes and standards mean the latest. Where not specified otherwise the installation shall generally follow the Kenyan Standard Specification for Road and Bridge Construction

2203 Measurement and Payments
Measurement and payment for all day works items shall be in accordance with the items listed in the Bill of Quantities, the preamble to Bill of quantities and the specifications above and cover the payment of plant, labour and materials for work executed in accordance with the Engineer's instructions.

2300 ENVIRONMENTAL MANAGEMENT PLAN
The Contractor shall implement the Environmental Management Plan (EMP) measures (Matrix Tables given below both for construction and maintenance and use phases), enhancement measures as directed by the Engineer. He shall submit the report on compliance with the Environmental Mitigation measures periodically to the Engineer. The Engineer will review the compliance submitted by the Contractor. The Occupational Safety and Health (OSH) should start with planning, hazard identification, risk assessment and risk control. Workers should go through induction on site rules and procedures, safety and welfare on site, emergency plans and procedures and all other OSH protocols as indicated in the OSH plan. Any contravention of the laid down regulations of the OSHA Act, 2007 will attract penalties and/or prosecution in a Kenyan court of law or retention of the Environmental guarantee.

Environment and Social Management Plan Matrix

Construction Phase

Table 1: Actions Matrix

Item №	Anticipated Impacts and Sources	Proposed Actions	Responsibility and Timeframe	Targets to Achieve	Monitoring Parameters
1	Degradation of water sources: Over-abstraction of water, Water quality degradation, Effects on downstream users, Stream bed siltation, Sources: Silt from earth moving, Oil and grease, Raw asphalt concrete, Workshops and machinery maintenance areas, Construction camp sites, Material preparation sites.	Observe regulations on Water abstraction permits, slope excavations, etc.), Monitor standards of sanitation at the construction camps, Establish a mechanism for solid waste collection, storage, transfer and disposal, Liaise with water authorities for installation of RGSs at all crossings. Promote recycling of wastewater and storm water Ensure regular maintenance of plumbing system and septic tanks to avoid spillage of raw sewage Construct a standard septic tank/bio-digester linked to a constructed wetland system or use eco-toilets Ensure spilt oil does not discharge into water sources Provide oil spill containment including concrete platform for servicing of construction equipment and holding of scrap oil drums Earth moving and excavations for construction to consider conservation of all wetlands and surface drainage.	The Contractor, The Resident Engineer. KURA Engineers. Immediate action and maintained throughout the project period.	Minimal silt discharging into water bodies, NO effects on physical status of water quality, Centralized effective collection of solid wastes	Status of streams and wetlands and water quality along reserve, General social Concerns. Specific attention at all crossings and other water bodies.

Item №	Anticipated Impacts and Sources	Proposed Actions	Responsibility and Timeframe	Targets to Achieve	Monitoring Parameters
		Control siltation of rivers and other surface drains.			
2	Air quality: Dust and particulate matter, Visual disruption, Particulate matter, Surface depositions, Bronchial and eye problems. Sources: Construction activities (earth moving and machinery operations).	Ensure earth surface roads, deviations and dry materials are kept damp at all times, Establish information flow process to the communities on dusty conditions, Keep inevitable dusty conditions and/or emissions as short as possible,	The Contractor and the Resident Engineer. Surveillance by the, NEMA Officials and Public Health Officials throughout the Project period	Low visible particulate matter in the air. Requirements of Clause 19 of the General Conditions of Contract	Dust level within the project, Exhaust fumes from Construction machineries. Project wide situation
3	Vegetation Cover Degradation: Removal of vegetation from road reserve and deviation routes, Loss of vegetation from material sites and access routes, Sources: Construction of deviations, Material borrow pits and quarries,	Collaborate with the Local authorities in their beatification programmes, Implement top-soiling and grassing programme for the road reserve and material sites, Introduce soft shrubs in the median of the dual carriage, Introduce trees on canopies on reserves near built-up areas, Ensure vegetation does not compromise road safety	The Contractor and Resident Engineer KURA Engineers to keep surveillance	Vegetation trend that is also safe to the road users. Requirements of Clause 19 of the standard Bid Docs	Greenery along the route of the road. Special attention at sloppy sections and river Crossings will be necessary.
4	Environmental Pollution: Siltation of water bodies, Pollution of water (turbidity and hydrocarbons residuals), Visual pollution (from dust and emissions), Sources:	Develop Standard Operating Procedures (SOPs), schedules and supervision guidelines for the project works, Focus on sensitive features (e.g. stream crossings and slopes) for necessary precautions, Establish dust control	The Contractor Resident Engineer NEMA offices, water offices and KURA Engineers to keep surveillance.	Minimal disruption to physical and biological environmental quality throughout the route.	Water quality, Environmental features, Risks to health and safety, Wastes characteristics. Pollutants from camp sites, service yards and material preparation

Item №	Anticipated Impacts and Sources	Proposed Actions	Responsibility and Timeframe	Targets to Achieve	Monitoring Parameters
	Oil/grease storage, Solid waste disposal (filters, greases, asphalt wastes, etc.), Construction machinery and vehicles, Excavated earth, Water abstraction points,	programme and machinery performance and waste disposal controls,			yards.

SECTION 24

HIV/AIDS, GENDER ISSUES, SOCIAL ISSUES AND LOCAL PARTICIPATION

2401 SCOPE

This Section of the specification sets out the Contractor's obligations with regard to on-site HIV/AIDS awareness campaign and preventive measures which are to be instituted.

2402 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.

2403 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.

In the awareness campaign, the Contractor shall employ and designate a safety officer who will undertake and co-ordinate all aspects of the HIV/AIDS awareness campaign.

2404 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 equivalent 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.

As part of the campaign, the Contractor shall operate at least one STD and HIV/AIDS clinic on site or make alternative arrangements with an existing suitably qualified and equipped local clinic. The Clinic shall have a minimum of two rooms each at least 10 sq. m with ablution and washroom. The clinic shall be suitably staffed and equipped for screening, diagnosis and counselling of STD and HIV/AIDS of the project staff and labour. The Contractor shall cover the costs of the clinic to provide free treatment for general STD cases, whereas workers with HIV/AIDS shall be referred to the national HIV/AIDS programme co-ordinated by the Ministry of Health.

2405 HIV/AIDS TRAINING PROGRAMME

2405.1 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 Contractor. The wider community will benefit indirectly through their normal day-to-day interaction with the target group.

2405.2 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 100 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:

- Preventive behaviour including partner reduction, condom use, awareness and appreciation of the importance of treatment of sexually transmitted incidences (STIs).
- Skills including negotiating safer sex, correct condom use, purchase of condoms without embarrassment.
- Referral to local health centres and available services.

Tasks to be undertaken to support the above activities include:

- Establishing the status and focus of all current and planned HIV/AIDS activities in the area to ensure complementarities and determining potential involvement in project activities.
- Carrying out a brief review of regional activities combining road construction with HIV/AIDS campaigns to determine options, best practice key issues, constraints, etc.
- Reviewing of Information, Education and Communication (IEC) materials available and their relevance to road construction, making recommendations for future development of IEC materials.
- Providing education and training for site personnel, supervisors and peer educators for the scope of activities as above.
- 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.
- Providing mechanisms for the social marketing of condoms and distribution of materials.
- 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.

2405.3 Collaboration

HIV/AIDS activities are co-ordinated nationally by the National Aids Control Council (NACC). MORPW, 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 complementary 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.

2405.4 Contractor responsibilities

The Contractor will employ and designate a qualified HIV/AIDS expert, 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:

- Scheduling appropriate timing and durations of the implementation of HIV/AIDS activities as part of workplan for labourers and supervisors. Designated rest times such as lunch breaks and pay days should be excluded.
- Identification of suitable individuals from recruitment records for education with the implementing organisation.
- Provision of suitable sites for communication activities and for condom distribution.
- Monitoring of the implementation of peer educator activities.
- Provision of support as necessary to the implementing organisation.

2405.5 Inputs

An organisation experienced in the provision of HIV/AIDS awareness and prevention activities will be selected as a Sub contractor to provide the above scope of activities on behalf of the main Contractor.

2405.6 Reporting

The implementing organisation will produce the following reports to be submitted to the Contractor, Consultants, MOR 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 MORPW, NACC and other interested organisations including the private sector, funding agencies and NGO's.

2406 TIMING

Activities shall commence at the start of the construction period and continue throughout the Contract Period 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.

2407 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.

a) Item: Instituting an HIV/AIDS awareness campaign

Unit: Month

The unit of measurement shall be the calendar month or part thereof, measured over the duration of the campaign. The tender rate shall include for providing a Safety Officer to deal with HIV/AIDS together with his/her transport requirements. The payment shall be made monthly, pro-rata for parts of a month, from the date of appointment of the officer until the completion of the Works or substantial demobilisation of the local workforce, whichever comes first.

b) Item: Instituting an HIV/AIDS prevention campaign

Unit: Month

The unit of measurement shall be the month. The rate shall include the cost of providing a clinic or make alternative suitable arrangements, running the clinic, providing condoms as per the specifications and meeting all the costs of time-related costs.

The payment shall be made monthly, pro-rata for parts of a month, from the date of establishing the clinic until the completion of the Works or substantial demobilisation of the local workforce, whichever comes first. Payment shall only be made for periods during which the Contractor has effectively provided the services.

c) Item: HIV/AIDS training Unit: Provisional Sum

Payment shall be made for the actual expenditure incurred by the Contractor for which receipted vouchers shall be produced. The tendered rate shall include full compensation for equipment, labour and material required for the provision of the services.
In addition, the Contractor will be paid for handling, overheads and profit at a percentage (%) rate of the receipted expenses incurred.

d) Item: Implementation of Environmental and Social Management Plan Unit: Lump Sum

Payment for implementation of the Environmental and Social Management Plan shall be paid in instalments in accordance with the following conditions:

(i) The Contractor will be paid 20% of the amount due when he has prepared a plan which has been approved by the Engineer.
(ii) 50% of the amount due will be paid in equal monthly instalments from the date the Engineer accepts the Plan over the remainder of the contract period, excluding the defects liability period.

30% of the amount due will be paid when the Contractor has completed the project, maintained the works and received a NEMA decommissioning approval.

SECTION 25

ROAD SAFETY AND ACCIDENT PREVENTION CAMPAIGN

2501 SCOPE

This Section of the Specifications sets out the Contractor's obligations with regard to on-site road safety campaign which is to be conducted during the construction period. The aim of this road safety campaign is to achieve safe road use during the construction of the project.

2502 GENERAL REQUIREMENTS

(a) Road safety prevention campaign

The Contractor shall institute a road safety campaign amongst his workers and the public for the duration of the contract. As part of the campaign the Contractor will be required to display road safety posters in all buildings frequented by workers employed on the contract, where such buildings fall under the control of the Contractor, and in all schools and public buildings within the road project area. In addition, at least three (3) of the Contractor's vehicles, regularly used on site shall display road safety posters. The posters shall be printed on gross 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.

In addition, the Contractor shall undertake the following as part of the road safety and accident prevention campaign:

i. Identify major crossing points and locations with potential for accidents on the project
ii. Provide adequate information signs for motorised and non-motorised traffic
iii. Provide temporary barriers to channelize non-motorised traffic.
iv. Provide road marshals during morning, lunch time and evening peak hours

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(b) Road safety training

The objective of the road safety campaign is to reduce the risk of exposure to road accidents in the area of the construction. The target group will be the general public alongside the road, especially the children, old and disabled persons. To achieve the objective the Contractor shall:

i. Organise for road safety seminars in conjunction with the Ministry of Roads, the Employer and the National Transport Authority
ii. Provide information posters in public places both on and offsite,
iii. Provide of road safety and awareness 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 public and the workers, determined by participatory approaches to ensure they are appropriate, desired and have a public impact. The scale and frequency of activities may also be adjusted to suit requirements of the target group.

i) Contractor Responsibilities

The Contractor will designate a qualified road safety expert, to be approved by the Engineer, who will work closely with the Employer and other implementing agencies to support the road safety campaign activities. This will ensure maximum effectiveness and integration with construction activities. Specific but not exclusive issues to be addressed by the Contractor are:

a. Scheduling of appropriate timing and duration for the implementation of the road safety campaign as part the workplan.
b. Identification of suitable individuals for education from recruitment records with the implementing organization.

c. Provision of suitable sites for communication activities.

d. Monitoring of the implementation of peer educator activities.
e. Provision of support as necessary to the implementing organisation

ii) Inputs

An organisation experienced in the provision of road safety campaign will be selected as a Sub contractor to provide the above scope of activities on behalf of the main Contractor.

iii) Reporting

The implementing organisation will produce the following reports to be submitted to the Contractor, Consultants and MOR:

a. monthly progress briefs for inclusion in site meetings.
b. quarterly reports detailing activities carried out, issues, follow up, etc.
c. a review report of activities in the road construction sector,
d. a review report of existing IEC materials with recommendations for development of materials specifically for the road sector.
e. 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.

iv) Timing

Activities shall commence at the start of the construction period and continue through out the Contract duration 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.

25 03 MEASUREMENT AND PAYMENT

The payment for items in this clause shall include full compensation for all work associated with the provision of road safety campaign related services as specified.

a) Item: Instituting a road safety 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 and material required for the provision of the service.

b) Item: Road safety training

Unit: Provisional Sum

Compensation for road safety specialists for the implementation of implementation of Clause 25 03 (b). Any amount required under this item will be approved by the Engineer, prior to expenditure. Handling costs and profit in respect of this sub-item will be paid as a percentage (%) of the Provisional Sum.

2601 SOLAR STREET LIGHTING

2602 General Technical Specifications of Equipment

This section gives specifications for lighting columns and brackets made from steel including lighting columns mounted on other structures, Solar panels, LED lighting, batteries, Controllers and other accessories. The specification stipulates the minimum requirements for street lighting accessories, for use in the project and it shall be the responsibility of the supplier to ensure adequacy of the design, good Employer Representativeing practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the items. The Employer Representative could give additional instructions to supplement the specification.

This specification is to be read in conjunction with the drawings which are issued with it. Bills of quantities shall be the basis of all additions and omissions during the progress of the works. This specification defines minimum requirements, but tenderers who offer superior facilities will be considered.

This specification covers the following items:

a) Lithium iron LiFePO4 Battery
b) LED Light
c) P.I.R sensor (motion sensor)
d) Controllers
e) Solar panel
f) Lamp Pole

Proposed All-in-One Solar Street Light Specifications

wer	300W	600W
LED Lamp	5050 LED 126PCS 6000K	2835 LED 540PCS 6000K
Lamp Size	1487*358*303mm	837*250*75mm
Solar Panel	18V 100W, Mono-Crystalline	6V 22W, Polycrystalline
BatteryType	LiFePO4 12.8V 80AH	LiFePO4 3.2V 24AH
Charging time	6-8 hours	6-8 hours
Discharging time	30-36 hours	20-24 hours
Lumen	160lm/w	160lm/w
Material	Aluminum	ABS
Install Height	8-12m	15-20m

2603 Battery

The battery shall be rated 12/24V and charge capacity as specified in the bills of quantities. The battery shall be of long-lasting maintenance free capable of a 5-year optimal operation.

Any tender which does not comply with the minimum requirements will be rejected.

The battery shall meet the following minimum requirements.

DESCRIPTION	SPECIFICATIONS	SPECIFICATIONS
Item Number	AI-LB12824	AI-LB12836
Battery Type	LifePO4	LifePO4
Nominal Capacity	12.8V 24AH（307WH)	12.8V 36AH（460WH)
Lifetime in cycles	2,000 cycles	
Cell Type	32700 3.2V 6000mAH	
Quantity of battery cell	16pieces	24 pieces
Array Mode	4P4S	6P4S
AC Impedance Resistance	≤100mΩ	≤100mΩ
Charging mode	Constant Current + Constant Voltage	Constant Current + Constant Voltage
Charge voltage	14.6±0.05V	14.6±0.05V
Discharge Cut-off Voltage	11±0.05V	11±0.05V
Max. Continuous Charging Current	15A	15A
Max. Continuous Discharge Current	15A	15A
Max. Instantaneous Discharging Current	42A	42A
Storage Temperature	-5℃~35℃	
RH for Storage	65±20%	
Operating Temperature	-20℃～60℃	
Size （L×W×H）	140×140×80 mm	210×140×80 mm

2604 Solar Panel

Polybrite Mono crystalline solar panels with over 20% high conversion efficiency and 25 years lifetime.

The panel shall be capable of providing power output at maximum solar input (at midday). The minimum power output at the lowest level of sunlight (sunset or cloudy weather shall not be below the specified output.)

The panel (Luminaire) shall be installed titled at the specified angle designed to maximum sunlight such that the entire sun rays are approximately directly perpendicular to the panel throughout the day.

For the purpose of this specification, the sizes of the panels shall be as below: -

i. 40W – 180W-watt peak (Wp) panels

Panels shall be tested under **Standard Test Conditions (STC)** at 1000W/M² at air mass of 1.5kg/m³ and cell temperature of 25°C. The result shall be presented in a current/voltage curve or graph.

The nominal peak power for each module as measured in the test in watts peak (WP) shall not be below 16 – 18 Volt range.

Each module shall have at its output terminals Blocking diodes connected in series with a string to protect the module from reverse current flow from either the adjacent module or battery bank.

The panels shall be protected from lightning and surges. The surge protecting devices shall be Circuit Breakers installed at the final output of PV array. It shall protect the array from reverse surges from battery bank or inverters.

Bypass diodes may be placed around a module that is likely to have localized shading. It provides a current path around such a shaded module.

The panels shall be installed tilted to reduce dust accumulation and allow for self-cleaning. The panel should be tilted at a minimum 15° due south. Dust may cause power reduction of about 10%. Tilts also allow for rain cleaning of the panels. However, the panels shall be cleaned immediately after the works are completed and approved.

The solar panel shall meet the following minimum requirements.

a)Technology:	Monocrystalline silicon
b) Nominal power:	Min 305/260/140-watt peak (Wp) Based on attached system sizing Calculation supplied by Contractors to rationalize their chosen Wp
c) Efficiency:	Minimum 18%
d) IP rating:	IP67
e) Service life:	> 25 years
f) Panel Warranty:	5-year
g) Production Warranty:	Minimum 10-year manufacturer of 90% minimal rated power output with working life of more than 25 years.
h) Solar panel frame:	Anodized aluminum alloy frame
i) Temperature tolerance:	40 - 85^{0}C
j) Marking:	EC
k) STC irradiance:	1000w/ m^2, cell temperature 250 centigrade.
l) Standards:	IEC-61215 IEC-61730 I and II with a global 3rd party certification of the indicated standards.
m) Clearance of Deposits at the bottom plane	Clear of any obstruction at the bottom of inclination avoid accumulation of deposits
n) Bird anti-patch mechanism	Include Bird anti-patch mechanism at the bottom of inclination i.e bird electric shock, gauge

2605 Led Light

The lamps shall be patented all in one design 300watts LED (Light emitting diode) streetlight. The LED light shall have the following features:

- Chips outstanding energy saving performance.
- Instant start and flicker free to reduce the eye strain.
- Very even light distribution and high uniformity, no glare to eyes
- Good color rendering, vivid colors under the light
- 5to10 year warranty

The LED light shall meet the following minimum requirements.

a) LED chip brands:	150W-300W with Bridgelux/CREE/Philipsled chips 3030, 160-170LM/W, 6000K ~6500K(customized 2700k-6500k)
b) Nominal power:	300watts LED
c) Voltage:	DC-12V/24V
d) Lamp location:	Lower side of the all-in-one solar luminaire
e) Light efficiency:	>180 lumens / Watt
f) CRI (Color rendering index):	>75
g) Color temperature:	>4000K
h) Operating temperature:	-30°C/+70°C
i) IP rating:	IP 65
j) Manufacturer on life span:	>50 000 h
k) Assembly of the lamp:	on a powder-coated steel arm
l) Heat management	Extruded aluminum heat sink and the heat sink must be in direct contact with the open air
m) Luminaire Shape	Anti-bird shape.

n) Certification	3rd party certification of the LED fixture specs

2606 MPPT Controller

The MPPT controller should meet the following minimum requirements.

a) Device:	Management electronic card
b) Material:	Composite of reinforced epoxy resin FR4 or equal and approved
c) Coating:	Tropicalized, double-varnishing
d) LED control:	DC-DC drivers integrated to the electronic card
e) Lighting program:	Permanent according to the program to Employer Representative's approval
f) Manufacturer life span to exceed:	3 years with a 6-year working life
g) IP rating:	IP 68 waterproofing with external temperatures sensors (working temperature -35 to +60)
h) Operation indicator:	Light signal/sensor on the electronic card automatically tracing solar panel max charging current
i) Operation indicator:	Light signal/sensor on the electronic card automatically tracing solar panel max charging current
j) Load control	Protection against overloads Protection against overheating Optimized load control Automatic balance of the cells Evaluation of the battery state of charge with high precision Management and control of the energy: Automatic switch on and off by twilight detection or programmable according to required light profile. Anti-blackout system integrated to the battery on tropicalized circuit board
k) Battery autonomy:	guaranteed lighting 365 nights per year every night (7 No. days of autonomy)

2607 Lamp Pole and Ancillary Equipment

The equipment should meet the following minimum requirements.

a) Minimum Manufacturer warranty of 10 years with a working life 25 year.
b) Anti-rust Q235 steel pole hot dip galvanized surface treatment along with additional polyester powder coating minimum 3.0mm thickness.
c) Compliant with IEC 60598 public lighting safety requirements
d) Anti-toppling foundation pole with ability to resist wind speeds exceeding 100 km/hr.
e) High visibility anti-accident reflector painting on poles base.
f) A specialized security system individual to each installation preventing theft of components.
g) 10m high with single/double horizontal arm of at least 80 cm (as specified in the B.O.Q.)
h) 1.0 *1.0 m advertisement provision as indicated in the drawings
i) Cylindrical-conical pole 8 meters (inside & outside as per BSEN ISO 1461 steel pole with additional polyester coating. 6mm thick, top plate diameter of 85mm and root diameter of 247mm with a reflective paint at the bottom with single/double arm and tube 3mm thick, 60mm diameter and 800mm long, in hot-dipped galvanized steel with anchor bolts.
j) Foundation kit, 1200mm deep with a radius of 450mm, cast with class 20 concrete reinforced with 100kg of steel work per cm^3 of concrete.
k) The pole shall be anchored with 4No. 20mm diameter J – bolt.

2608 Description of the Works

The Works provided for under this Contract consist of; supply, installation, testing & commissioning of Solar streetlights North Horr- JN Darathe AP Camp (A4) road sections.

2609 Location of the Works.

The site of the proposed works is located at various road sections in North Horr- JN Darathe AP Camp (A4)

2610 Scope of the works

The scope of works for installation of the Solar streetlights system include: -

i. Installation of Solar Panels on top of a pole complete with enclosed Batteries in a special enclosure
ii. Installation of Solar LED lighting on top of the pole linking the panel and Battery Bank by suitable sized cables.

2611 Climatic conditions

The solar street lighting installations shall be suitable for continuous us outdoors in tropical areas of:

Mean Maximum Temperatures	+40□C
Mean Minimum Temperature	-1□C
Range of Relative humidity	up to 95%
Altitude above sea level	up-to- 2200m
Latitude /Longitude	……□ …….'S/……□ …….'E
Solar Radiation,	5.1 Hours (month)

Extremely heavy rains fall at certain periods of the year and the contractor shall be deemed to have taken account of this factor both in his prices and his planning of the execution of the contract works.

Equipment de-rating factors for the temperature and altitude shall be stated.

2612 Plant, Materials and Workmanship

a) Standard of Materials

Where the material and equipment are specifically described and named in the Specification followed by approved equal, they are so named or described for the purpose of establishing a standard to which the Contractor shall adhere.

Should the Contractors install any material not specified herein before receiving approval from the proper authorities, the Employer Representative shall direct the Contractor to remove the material in question immediately. The fact that this material has been installed shall have no bearing or influence on the decision by the Employer Representative.

All materials condemned by the Employer Representative as not approved for use, are to be removed from the premises and suitable materials delivered and installed in their place at the expense of the Contractor. All materials required for the works shall be new and the best of the respective kind and shall be of a uniform pattern.

The Contractors shall carry out the manufacture of Plant, the production and manufacture of Materials, and all other execution of the Works:

a) in the manner (if any) specified in the bid documents,
b) in a proper workmanlike and careful manner, in accordance with recognised good practice, and
c) with properly equipped facilities and non-hazardous Materials, except as otherwise specified in the bid documents.

The Contractor shall submit the following samples of Materials, and relevant information, to the Employer Representative for consent prior to using the Materials in or for the Works:

a) manufacturer's standard samples of Materials and samples specified in the bid documents, all at the Contractor's cost, and
b) additional samples instructed by the Employer Representative as a Variation. Each sample shall be labelled as to origin and intended use in the Works. The Employer Representative's Personnel shall at all reasonable times:
c) have full access to all parts of the Site and to all places from which natural Materials are being obtained, and
d) during production, manufacture and construction (at the Site and elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials.
e) The Contractor shall give the Employer Representative's Personnel full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.

b) Workmanship

The workmanship and method of installation shall conform to the best standard practice. All work shall be performed by a skilled tradesman and to the satisfaction of the Employer Representative. Helpers shall have qualified supervision.
The Contractor shall give notice to the Employer Representative whenever any work is ready and before it is covered up, put out of sight, or packaged for storage or transport. The Employer Representative shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Employer Representative does not require to do so. If the Contractor fails to give notice, he shall, if and when, required by the Employer Representative, uncover the work and thereafter reinstate and make good, all at the Contractors 's cost.

Any work that does not, in the opinion of the Employer Representative conform to the best standard practice will be removed and reinstated at the contractor expense.
Permits, Certificates or Licenses must be held by all tradesmen for the type of work; in which they are involved where such permits, certificates or licenses exist under Government legislation.

c) Procurement of Materials

The Contractor is advised that no assistance can be given in the procurement or allotment of any materials or products to be used in and necessary for the construction and completion of the work.
The Contractor will be required to make their own arrangements for the supply of materials and/or products specified or required.

d) Shop Drawings

The Contractor shall submit two copies of detailed drawings of steel galvanised poles, steel galvanized anchor bolts assembly, methodology for spot welding the All-in-One solar street light luminaire on the pole arm as a measure of curbing vandalism, detailed luminaire specifications complete with samples of the proposed luminaire for review and approval by the Employer Representative and client team. All equipment including their components showing all pertinent information including sizes, capacities, construction details, etc., as may be required to determine the suitability of the equipment for the approval of the Employer Representative. Approval of the detailed shop drawings shall not relieve the contractor of the full responsibility of errors or the necessity of checking the drawings himself or of furnishing the materials and equipment and performing the work required by the plans and specifications.

e) Manufacturer's Data

Submittal for each manufactured item of all electrical equipment, components and accessories specified shall be current manufacturer's descriptive literature of catalogued products, equipment drawings, diagrams, performance and characteristic curve s and catalogues cuts.

f) Certified Laboratory Test Reports

Submit manufacturer's Type Test Reports for the All-inOne solar street light luminaries; the tests to include and not limited to:-

1. Electrical Tests

Test	Description
Continuity Test	Verifies proper wiring and connectivity of the circuit.
Insulation Resistance Test	Ensures there's no leakage between conductors, especially between LED driver, battery, and panel.
Hi-Pot (High Voltage) Test	Confirms insulation can withstand surge voltages without breakdown.
Battery Charging/Discharging Test	Simulates charging under solar input and monitors voltage levels over a discharge cycle.
Overvoltage/Undervoltage Protection Test	Ensures the battery management system (BMS) triggers at specified limits.
Short-Circuit Protection	Verifies system shutdown upon detection of a short to prevent hazards.

2. Optical and Photometric Tests

Test	Description
Luminous Flux (lm)	Measures total light output using an integrating sphere or goniophotometer.
Luminous Efficacy (lm/W)	Efficiency of light output relative to power input.
Color Temperature (CCT)	Ensures the LED emits the correct color temperature (e.g., 6000K for daylight).
Color Rendering Index (CRI)	Measures accuracy of color representation under the light.
Beam Angle Measurement	Verifies the spread and focus of the light output.

3. Mechanical Tests

Test	Description
Vibration Test	Simulates transportation vibration to check for structural integrity.
Drop Test	Ensures the product withstands accidental drops during handling.
Torque Test	Ensures all fasteners are properly tightened and meet specs.
Assembly Integrity Check	Verifies correct installation of solar panel, LED module, battery, and housing.

4. Environmental & Reliability Tests

Test	Description
IP65 Waterproof Test	Tests resistance to water jets (using spray nozzles or water chamber).
High/Low Temperature Test	Exposes lights to extreme temperatures (-20°C to +60°C typically).
Humidity Test	Checks for corrosion and electrical issues in humid conditions.
UV Aging Test	Simulates sun exposure to test material degradation.
Salt Spray Test	For coastal installations, tests corrosion resistance of casing and fasteners.
Thermal Cycling Test	Repeated heating and cooling to simulate daily temperature fluctuations.

5. Functional Tests

Test	Description
Motion Sensor Test	Validates that the PIR or microwave sensor detects motion at correct range and triggers brightness increase.
Light Sensor (Dusk-to-Dawn)	Checks automatic switching ON/OFF based on ambient light.
System Burn-In Test	Runs the complete unit continuously (often for 24–72 hours) to check for early failures.
Remote Control Function Test	If applicable, tests all remote-control features including brightness levels and timers.

g) Certification of Compliance

(a) Submit manufacturer's certifications as required on products, plants, facilities, finish, and equipment indicated in the Specifications. Certifications shall be documents prepared specifically for this specification.

(b) The manufacturer's certification shall name the appropriate products, plants, equipment, facilities, or materials and the publication specified as controlling the quality of that item.

(c) Certification shall not contain statements to imply that the item does not meet requirements specified, such as "as good as", achieve the same and use and results as materials formulated in accordance with the referenced publications" or "equal" or "exceed the service and performance of the specified materials". Certification shall simply state that item conforms to the requirements specified. Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificate of compliance.

h) Operation and Maintenance Manuals

1. Submit Operation and Maintenance Manuals as required for systems and equipment indicated.
2. In the manual, the names, addresses, telephone and e-mail address of each sub-contractor installing the system or equipment shall be included. Include a table of contents and assemble the manual to conform to the table of contents, with the tab sheets placed before instructions covering the subject. The instruction shall be legible and easily read, with large sheets of drawing folded in. the manual shall include:
   (i) Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the system or equipment.
   (ii) A control sequence describing start up, operation and shutdown.
   (iii) Description of the function of each principle item of equipment.
   (iv) Installation and Maintenance Instructions
   (v) Safety Precautions
   (vi) Diagrams and Illustrations
   (vii) Testing Methods
   (viii) Performance data
   (ix) Lubrication schedule including type, grade, temperature range and frequency
   (x) Part List: The list shall indicate sources of supply, recommended spare parts and name of servicing organization.
   (xi) Appendix: List qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.

i) As Built Drawings

These diagrams and drawings shall show the completed installation including sizes, and arrangements of the installation. The drawings shall be scaled not less than 1:50 and shall include plan views and section.

The drawings shall include all the details which may be useful in the operation, maintenance or subsequent modifications or extensions to the installation.

Three sets of diagrams and drawings shall be provided, all to the approval of the Employer Representative.

One coloured set of line diagrams relating to operating and maintenance instructions shall be framed and mounted in a suitable location.

Solar PV design drawings, manuals and software must be provided.

j) Regulations and Standards

All work executed by the Contractor shall comply with the current edition of the "Regulations" for roads and public lighting, issued by the British and European standards (EN40 and EN 13201), and with the Regulations of the Local Electricity Authority or equal and approved codes, or the competent Authority.

Where the two sets of regulations appear to conflict, they shall be clarified with the Employer Representative. All materials used shall comply with relevant Kenya Bureau of Standards Specification.

k) Setting Out Work

The Contractor at his own expenses; is to set out works and take all measurements and dimensions required for the erection of his materials on site; making any modifications in details as may be found necessary during the progress of the works, submitting any such modifications or alterations in detail to the Employer Representative before proceeding and must allow in his costing for all such modifications and for the provision of any such sketches or drawings related thereto.

l) Positions of Solar Street Lighting

The position of all solar street lighting columns shall be as indicated in the Employer Representatives drawings and as agreed with the Employer Representative. These positions shall be clearly marked on site to prevent obliteration before any work is carried out.

m) Identification of Solar Street Lighting

The Contractor shall supply and install identification labels to all plant and to all switches and items of control equipment with, where no excessive heating is involved, white Traffolyte or equal labels engraved in block lettering denoting the name/function and/or section controlled. Where heating is likely to distort Traffolyte, approved aluminium labels with stamped or engraved lettering shall be used.

The labels shall be mounted on equipment and in the most suitable positions. They shall be in English or in internationally understood symbols capable of being read without difficulty. The labels shall conform to descriptions used on record drawing. Details of the lettering of the labels and the method of mounts or supporting shall be forwarded to the Employer Representative for approval prior to the manufacture.

2613 TESTS

a) General

Installation tests shall be carried out throughout the works, whenever it is necessary, and at the end of the works. Tests shall be consistent with the specifications of the bid document and the standards in force.

The Contractor shall supply, without any additional payment, all equipment, analytical instruments, and labour necessary for conducting these tests. Analytical instruments shall be sealed and supplied with recent calibration certificates provided by an official laboratory. All tests shall be carried out on the responsibility of the Contractor.

In the event of a failure of the tests, tests shall be repeated after the Contractor has carried out the necessary repairs or replacements.

The results of the tests shall be set out in a report signed by the Employer Representative or his representative and by the Contractor.

b) Types of Tests

Tests shall comprise, but shall not be limited to, the following:

i. Visual Inspection
ii. Operation Tests
iii. Performance Tests

i. Visual Inspection

The visual Inspection shall entail:

- Checking the state of the equipment and the quality of work.
- Checking levels and alignments.
- Verifying the effective characteristics of the equipment.
- Measurement of the Insulation and Circuitry Continuity

This test shall be conducted on the various circuits after receivers have been removed.

ii. Operation Tests

All electrical equipment shall be tested when operating in order to verify conformity with the specifications of the tender document and the installation regulations.

iii. Performance Tests

These tests shall be conducted in order to verify the features of the installations and conformity with the standards in force.

The Contractor shall conduct any other test deemed necessary by the Employer Representative in order to verify the condition and the functioning of the installations.

c) Rejection

If, as a result of an examination, inspection, measurement or testing, any Plant, Materials or workmanship is found to be defective or otherwise not in accordance with the bid documents, the Employer Representative may reject the Plant, Materials or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the defect and ensure that the rejected item complies with the bid documents.

If the Employer Representative requires this Plant, Materials or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and retesting cause the Employer to incur additional costs, the Contractor shall bear the costs to the Employer in accordance with the contract.

d) Remedial Work

Notwithstanding any previous test or certification, the Employer Representative may instruct the Contractor to: remove from the Site and replace any Plant or Materials which is not in accordance with the specification, remove and re-execute any other work which is not in accordance with the specification, and execute any work which is urgently required for the safety of the Works, whether because of an accident, unforeseeable event or otherwise.

The Contractor shall comply with the instruction within a reasonable time, which shall be the time (if any) specified in the instruction, or immediately if urgency is specified in the specifications.

If the Contractor fails to comply with the instruction, the Client shall be entitled to employ and pay other persons to carry out the work. Except to the extent that the Contractor would have been entitled to payment for the work, the Contractor shall pay the Client all costs arising from this failure in accordance to the Contract.

e) HIGH MAST FLOOD LIGHTING

e.1 High-mast construction

The high-masts for area lighting shall be the type incorporating a lantern carriage which can be serviced by using a Cherry Picker Truck.

The columns of the masts shall be continuously tapered with circular or polygonal cross section, to present an aesthetically good, slim visual appearance.

Stainless steel shall have adequate corrosion resistance to chlorides in the atmosphere, as 1.4401 or 1.4404 grade stainless steel to BS EN 10088-2, (316S31 or 316S11 to BS 1449-2), or equivalent to the Employer Representative's approval.

The masts shall be designed to Technical Report No. 7 of the Institution of Public Lighting Employer Representatives (UK), for a maximum wind speed (3 seconds gust at 10 m above ground level) of 50 m/s. The deflection at the top of the masts at wind gusts of 30 m/s (105 km/h) shall not exceed 1/40 of the mast height.

The high-mast columns shall be of mild steel BS EN 10025 grade Fe. 430C / S275J0 or equivalent. The columns shall be hot dipped galvanized as specified for corrosion Class 4.

High mast columns shall be supplied in section not exceeding 10 M in length. The high mast columns shall be in the standard product range of the manufacturer.

Each high-mast column shall have the facility of raising and lowering the luminaire carriage using a winch and wire ropes. The winch shall be built into the base compartment of the mast.
Provision for earthing the masts shall be provided using a 12 mm diameter stainless steel or brass stud with nuts and washers fixed to the main body of the mast structure in the base compartment.
Each mast shall be provided with effective means of lightning protection. The base flange shall be manufactured from a steel plate free from lamination. The shaft shall penetrate the full depth of the base plate and shall be welded above and below using an approved method. The base flange shall be circular, approximately 700-750 mm in diameter and of minimum thickness of 25 mm.
Gusset plates shall be provided between all bolt holes to give additional strength to the masts.

e.2 Base compartment

The base compartment of each mast shall be provided with an access opening with a door. The door to the opening shall be mounted using a substantial lug and secured at the top by a recessed socket head screw. A baseboard shall be provided for mounting electrical control equipment, power receptacle and winch. The cable entry to the base compartment shall be from a central hole in the base flange.

e.3 Head frame assembly

The head frame assembly shall be made of welded steel construction and hot dipped galvanized. Pulley wheels for the hoist rope and power cable shall be made of cast aluminium alloy or approved equivalent and shall be of a large diameter. It shall, as a minimum, suit the recommended bending radius of the power cable.
Loose fitting, removable guards shall be provided over the pulley wheels to ensure the correct location of the steel wire rope and power cable in their grooves when operating either in loaded or slack condition.
The shaft on which the pulley wheels revolve shall be of approved corrosion resistant material. The shaft shall be positively secured in the head frame assembly to prevent rotation. Lubrication, if required, shall be for the lifetime of the pulley assembly. Separate pulleys shall be provided for the cable and the wire ropes. It shall be ensured that the wire rope and the power cable are separated before entering the pulleys by means of guards or other mechanisms. The assembly shall be arranged to fit on to the top of the mast and an approved arrangement shall be provided for locking it to the mast and to prevent rotation about the mast.
The head frame shall be covered by a canopy of spun aluminium, galvanized and painted or stainless steel or equivalent, to the Employer Representative's approval. The canopy shall be fixed to the head frame by stainless steel bolts. The whole of the head frame assembly shall be designed and constructed for operation over the life of the mast without the necessity for any maintenance.
The head frame shall incorporate a lightning protection rod air terminal permanently connected to the mast column by a copper down conductor of minimum cross-section area of 50 mm^2.

e.4 Luminaire carriage

The luminaire carriage shall be of robust construction, keeping the number of individual components to a minimum. The frame of the carriage shall be capable of being fitted to and removed from the mast after erection of the mast.
Each carriage shall be designed to carry luminaires required for the specified lighting including accessories, cable junction box, one obstacle light, and one access point unit for wireless data coverage.
The access point will be approximately 0.3 x 0.2 x 0.2 m and have a maximum weight of 15 kg.
The luminaire carriage shall be of steel construction and hot dip galvanized, in the form of a semi-circle or regular polygon, split on diameter. The required number of pre-drilled mounting plates designed for attaching the luminaires, accessories and wireless access points shall be welded to the luminaire carriage prior to galvanizing.
The luminaire carriage shall be designed for raising and lowering the entire height of the mast. It shall be suspended from two or three steel wire ropes. Where three ropes are used, they shall be connected to the winch rope by means of a transition plate. The transition plate shall have

provision for connecting the suspension ropes and the wire rope from the winch. Suitable rollers, guides or rubbing surface shall be provided on the luminaire carriage so that they assist in and prevent damage to the high-mast surface during raising and lowering operations. Fixed, visually conspicuous guide rails along the length of the mast column will not be accepted.

Any loads needed for balancing shall be included in the Contract and shall be of an inconspicuous design

The carriage shall be arranged in such a way that it aligns firmly against guides and stops when in the service position. The stops shall be of adequate strength to ensure that they are not damaged by over-winding of the winch.

The luminaire carriage shall have provision for supporting and gripping the weight of the electric supply cable without causing damage to the cable. The cable shall not make any abrading contact with the cable suspension point or other components at any time. Approved rubber/PVC/brass bushes shall be provided where the cable comes into contact with sharp edges on the winch.

Approved weatherproof glands shall he provided for termination of cables.

e.5 Winch

Each mast shall be provided with twin or single drum winch suitable for raising and lowering the luminaire carriage. The winch shall have a safe working load capacity to carry the weight of the luminaries, accessories, balancing weights and luminaire carriage with addition of minimum of 10% weight.

A separate test certificate shall be issued with each winch. Each winch shall be permanently identified to correspond with the numbering of the applicable test certificate.

The winch shall be provided with a self-contained lubricated totally enclosed system and shall not require any maintenance during the service lifetime. The design of the winch shall be such that it can be installed in or removed from the mast through the door opening. The winch shall be fitted with a positive locking device, which shall remain engaged to prevent rotation in the lowering direction when the mast is in service.

The device shall automatically go to locked position whenever the operating handle or driving tool is removed

The winch drum shall be made of cast aluminium alloy grade BS EN 1676LM6M, cast iron or equal construction approved by the Employer Representative.

The drum shall be grooved unless the first layer of wire rope remains fully applied during all the normal operation at the winch, in which case a plain drum may be provided.

The winch shall be suitable for operation both by hand and from a power tool drive. Necessary clamps or fixing devices to hold the tool in position shall be provided.

e.6 Mast wire

The mast shall be fitted with flexible stranded stainless-steel wire rope having a minimum tensile strength of 1625 N/mm^2. It shall have factor of safety of not less than 5 times the safe working load of the winch and shall be suitable for the designed application.

The termination of the wire rope shall be by compression crimp joint or grip. In cases of termination of ropes at the shackle point on single drum winches, it shall only be made by a compression crimp joint.

Thimbles or eyes shall be fitted as required. Termination shall be made strictly in accordance with BS 302 and shall be certified.

Additional safety chain kits shall be provided and connected in between the rope shackle and the cleat, located inside the base when the luminaire carriage is in the raised position.

e.7 Electrical winch

A winch shall be provided for raising and lowering the luminaire carriage. The winch shall be heavy-duty type. The winch shall operate on 240 V, 50 Hz single phase supply. The power tool shall include an automatic torque limiter.

It shall be possible to operate the winch from a remote position, minimum 5 m from the centre axis of the high mast. The remote operation shall rely on a removable cable connection between a remote hand-held control box and the electrical power unit.

e.9.1 Mechanical winch

Gear Type: The Manual winch will employ use of worm gear, spur gear, or planetary gear system.
Worm Gear: Provides a high mechanical advantage and prevents back-driving, which is useful for keeping the load stationary.
Gear Ratio: a gear ratio of 4:1 to 20:1, meaning for every 1 turn of the handle, the drum rotates 4 to 20 times.
Efficiency: The winch should be designed with high efficiency (typically above 80%) to minimize the effort required to operate it.
Handle length of 250 mm to 600 mm, depending on the size of the winch and expected load.
Handle Type: The handle should have a comfortable grip, typically made of steel, aluminum, and have ergonomic features like rubber grips.
Direction of Rotation: Clearly marked or designed to indicate the direction for lifting and lowering.
Reversible Gear Mechanism: to include a reversible gear mechanism for both lifting and lowering the load with the same handle direction.
Mechanical Advantage: The winch should be designed to allow manual operation with reasonable effort even for heavy loads.

PART 3 – CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section VIII - General Conditions of Contract

1. GENERAL CONDITIONS

The Conditions of Contract comprise the "GCC", which form part of the "Conditions of Contract for EPC/Turnkey Projects, FIDIC 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC).

SECTION IX - SPECIAL CONDITIONS OF CONTRACT/APPENDIX TO FORM OF TENDER

The Particular Conditions of Contract (PCC) are set out hereunder. The Clauses in the PCC are additional to or as amendment to the "GCC".

In the preparation of these Conditions of Particular Applications the document followed is Conditions of Contracts for EPC/Turnkey Projects FIDIC, 1999.

Any change, deviation, deletion or addition to Conditions of Contract for EPC/Turnkey Projects FIDIC, 1999 has been recorded in the Particular Applications with same clause or sub clause reference.

APPENDIX TO FORM OF TENDER

CONDTITIONS	GCC CLAUSES	DATA
Employer's Name and Address	1	DIRECTOR GENERAL, KENYA URBAN ROADS AUTHORITY, BARABARA PLAZA, BLOCK D, P.O. BOX 41727-00100, NAIROBI Tel. No.: +254 – 020 - 8013844/0717105233 dg@kura.go.ke
Date of Commencement	1.1.3.2 & 8.1	The Date of Commencement shall be no later than 28 days from date of Letter of Commencement issued by the Employer's Representative subject to approval of the Construction Document, right of access to the site having been given to the contractor and payment to Contractor of First Instalment.
Time for Completion	1.1.3.3 & 8.2	36 months from the Commencement Date.
Defects Notification Period	1.1.3.7	12 months.
Variation	1.1.6.8	The Variation shall not exceed 25% of the Contract Price.
Law and Languages	1.4	Laws of the Republic of Kenya; English Language.
Amount of Performance Security	4.2	10% of the Contract Price in the form of an Unconditional Bank Guarantee, acceptable to the Employer.
Technical Standards and Regulations	5.4	The design, construction and tests shall comply with relevant technical standards currently in effect in Kenya, including but not limited to the Road Design Manual and the Standard Specifications for Roads and Bridges. Where technical standards for Kenya are not available, alternative equivalent standards from other countries also may be accepted by the Employer.
Amount of Delay Damages	8.7	0.01% of the Contract Price for each day of delay, subject to a maximum of 3% of the Contract Price.
Variation Procedure	13.3	The Variation and the adjustments to the Contract Price shall be not more than 25% of the Contract Price.
Advance Payment	14.2	The Advance Payment should be 20% of the Contract Price. Deductions shall commence in the next interim Payment Certificate following that in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds twenty percent (20%) of the Accepted Contract Amount less Provisional Sums and completed by eighty percent (80%) total of all certified interim payments.
Percentage of retention	14.3(c)	Percentage of retention is 5% of the Instalment Value.
Limit of Retention Money	14.3(c)	Limit of retention is 5% of the Contract Price.

CONDTITIONS	GCC CLAUSES	DATA
Currencies of Payment	14.15	As stipulated in the Loan Agreement between Government of Kenya and the Financial institution.
Insurance against Injury to Persons and Damage to Property	18.3	KShs. 10,000,000 (Kenya Shillings Ten Million only) per occurrence, with the number of occurrences unlimited.
Dispute Adjudication Board	20	Refer to Clause 20 in PCC.

CONDITIONS OF PARTICULAR APPLICATION (CONDITIONS OF CONTRACT)

1. GENERAL PROVISIONS

Definitions	Clause	
The Contract	1.1.1.1	"Contract" shall be deemed to form and be read and construed by the following documents: (a) The Contract Agreement; (b) Notification of Award; (c) The Letters of Acceptance; (d) Minutes of Contract Negotiations; (e) The Particular Conditions of Contract; (f) The General Conditions of Contract; (g) The Employer's Requirements; (h) Schedule of Payments; (i) The Tender Documents; (j) Non-Binding BoQ (for references only); (k) The Performance Security.
Performance Guarantees and Schedule of Payments	1.1.1.5	The format of the Performance Guarantee and Schedule of Payments are appended in Annex to the Contract.
Parties and Persons	1.1.2.2	"Employer" means: DIRECTOR GENERAL, KENYA URBAN ROADS AUTHORITY, BARABARA PLAZA, BLOCK D, P.O. BOX 41727-00100, NAIROBI Tel. No.: +254 – 020 - 8013844/0717105233 dg@kura.go.ke .
Contractor	1.1.2.3	"Contractor" means, ...
Employer's Representative	1.1.2.4	"Employer's Representative" means: DIRECTOR (URBAN ROADS DEVELOPMENT), KENYA URBAN ROADS AUTHORITY, BARABARA PLAZA, BLOCK D, P.O. BOX 41727-00100, NAIROBI DirectorURD@kura.go.ke
Dates, Tests, Periods and Completion	1.1.3.1	"Base Date" means the date 28 days prior to the date for submission of Tender Document.
Commencement Date	1.1.3.2	Commencement Date shall be 28 days from date of Letter of Commencement issued by the Employer's Representative subject to submission and approval of contractor's programme of works and other construction documents, right of access to the site having been given to the contractor and payment of the advance payment to Contractor.
Time for Completion	1.1.3.3	The Time for Completion is 36 months from the Commencement Date.

Defects Notification Period	1.1.3.7	"Defects Notification Period" has the same meaning as "Defects Liability Period". The Defects Notification Period shall be 12 calendar months from the date of issue of the Taking-Over Certificate.
Foreign Currency	1.1.4.4	Foreign Currency means United States Dollar and Chinese Yuan Renminbi.
Other Definitions	1.1.6.9	*"Individual Loan Facility Agreement" means the loan agreement to be signed between the National Treasury of Kenya, and the financial institutions of China to finance the Project.* *"Public Utilities" means pipes for water supply, gas/oil and sewage: the overhead and underground transmission facilities of electricity and telecommunication and any other as advised by the Employer.*
Communication	1.3	The communication including for giving or issuing of approvals, certificates, consents, determination, notices and requests shall be in writing. The approvals, certificates, consents and determinations shall not be unreasonably delayed or withheld.
Law and Language	1.4	The Contract shall be governed by the Laws of the Republic of Kenya. The language for communications shall be English. All key staff of the Contractor shall be fluent in English language and will communicate only in the language of the Contract in the process of execution of the Contract. Any foreign staff employed by the Contractor shall be capable of communicating effectively in English. Any bill boards or notices by the Contractor must be written in the language of the Contract; and that use of any other language will be with strict prior approval by the Employer's Representative in which case appropriate English translations must be included.
Priority of Contract Documents	1.5	*Delete and insert the following.* The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of documents shall be in accordance with the following sequence: a. The Contract Agreement; b. Notification of Award; c. The Letters of Acceptance; d. Minutes of Contract Negotiations; e. The Particular Conditions of Contract; f. The General Conditions of Contract; g. The Employer's Requirements; h. Schedule of Payments; i. The Tender Documents; j. Non-Binding BoQ(for references only); k. The Performance Security.
Contract Agreement	1.6	The Parties shall enter into the Contract Agreement within 28 days after receipt of Letter of Acceptance.
Compliance with Laws	1.13	*Add Sub-Clause 1.13(b) and substitute with the following:* (b) The Contractor will be exempted from payment of VAT, IDF levy, Import Duties and Railway Development Levy upon application and the Employer shall apply and recommend for eligible taxes for the contractor from the relevant authority, subject to approval by the National Treasury in line with the Constitution and prevailing laws.

Add new subparagraph to Sub-Clause 1.13

(c) Add Disclosure Clause:

Contractor hereby declares that he has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Kenya or any administrative subdivision or agency thereof or any other entity owned or controlled by Government of Kenya through any corrupt business practice.

Without limiting the generality of the foregoing, Contractor represents and warrants that he has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to any person within or outside Kenya either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultation fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from Government of Kenya, except that which has been expressly declared pursuant hereto.

Contractor certifies that he has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with Government of Kenya and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

Contractor accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. He agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other right and remedies available to Government of Kenya under any law, contract or other instrument, be voidable at the option of Government of Kenya.

Notwithstanding any rights and remedies exercised by Government of Kenya in this regard, Contractor agrees to indemnify Government of Kenya for any loss or damage incurred by he on account of its corrupt business practices and further pay compensation to Government of Kenya in an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by Contractor as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from Government of Kenya.

(d) Government of Kenya has made it mandatory that on each project some allocation of funds must be made for AIDS awareness. Therefore, some funds within this contract shall be allocated for HIV/AIDS mainstreaming in this contract.

(e) No member or officer of the Employer or anyone of their respective staff or their employees shall be in any way personally bound or liable for the acts or obligations of the Employer under the Contract or answerable for any default or omission in the observance or performance of any of the acts, matters or things which are herein contained.

2. THE EMPLOYER

Right of Access to the Site — 2.1

At the end of the first paragraph insert:

"Before handing over the site or portions of the site to the Contractor, the Employer shall be responsible for and complete dismantling, transferring and relocating of houses and facilities which are within the Right of Way and affect the construction.

		The Contractor shall give advance notice to the Employer of not less than 56 days with all necessary details on the section or area of the works where the contract requires relocation of underground public utilities. The Employer shall provide reasonable assistance to the Contractor in identifying, relocating or protecting underground public utilities in order to avoid damage during construction. The Employer will provide details of the width of right of way available along the alignment and will also provide reasonable assistance to the Contractor in the Contractor's acquisition of land/borrow pits and other matters when requested.
Permits, License or Approvals	2.2 (b) (iii)	*Modify as follows:* "For the import and export of Contractor's equipment when it is entering into or removed from the site.

3. THE EMPLOYER'S ADMINISTRATION

Employer's Representative	3.1	*With reference to Clause 3.1, the following provision shall also apply* An Employer's Representative shall be appointed by the Employer. The Employer's Representative and, where applicable, his assistants, shall exercise the authority delegated by the Employer. The Employer's Representative's authority to make variations should be less than 25% of the Contract Price.

4. THE CONTRACTOR

Performance Security	4.2	*Add new paragraph at end of Sub-Clause 4.2* The Contractor shall provide performance security for his proper performance of the Contract to the Employer within 28 days after both the following conditions are fulfilled namely; (i) signing of the Contract Agreement; (ii) signing of the Individual Loan Facility Agreement between the National Treasury of Kenya and the financial institution(s) of China. The Performance Security shall be in the form of an unconditional bank guarantee acceptable to the Employer, of an amount equivalent to 10% of the Contract Price stated in the Contract. The Performance Security shall be issued either by a bank located in the country of the Employer or a foreign bank which is acceptable to the Employer. Without limitation to the provisions of the preceding paragraph, whenever the Employer's Representative determines an addition to the Contract Price as a result of a change in cost and/or legislation or as a result of a variation amounting to more than 25 percent of the portion of the Contract Price, the Contractor, at the Employer's Representative's written request, shall promptly increase the guarantee amount of the Performance Security by an equal percentage.
Safety Procedures	4.8	*After the word "shall" appearing in the opening line insert:* To the extent to which the Contractor is in exclusive possession of the Site handed over. *Delete(b) and substitute as the following:* (b)take care for the safety of all employees of the Contractor, the Employer's representatives and other persons which was authorised by the Contractor to access the Site.
Avoidance of Interference	4.14	*Add the following sentence after the last word "interference":* Only if the Contractor violation the normal working time approved by the Employer.

Protection of the Environment	4.18	*Add the Sub-clause 4.18 and replaced by the paragraph:* The Contractor, to ensure protections of the environment, shall take all necessary measures and precautions in conformity with statutory and regulatory environmental requirements enforced.
Security of the Site	4.22	*Add following at the end*: The Contractor shall; (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards Contractor's Personnel, Employer's Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Specification. The Employer shall provide necessary security assistance to the contractor in the event of terrorism, armed robbery and so on during the construction period.
5. DESIGN		
Contractor's Documents	5.2	*Add following paragraph to sub-clause 5.2* The Contractor shall be required to submit the contractor's documents to the Employer's Representative during the construction and at the completion of the Works for approval or otherwise as a routine submission. Two hard copies and Ten properly labelled soft copies/CDs (compact disks)/DVD as per the employer's requirements listed as follows: 1. Program of Work; 2. Final Engineering Design Report; 3. Final Drawings; 4. Monthly & Quarterly Progress Report; 5. ESIA & RAP Report as per employers requirement; 6. Preliminary Materials Investigation Report; 7. As-built Drawings, including cross-sections and cross drainage structures; 8. Final Construction & Maintenance Report, including Maintenance Manuals; 9. Operations and Maintenance Manual for all facilities; 10. Land acquisition drawings ; 11. Design team to submit a list of technical staff required at detailed design;
Technical Standards and Regulations	5.4	The design, construction and tests shall comply with relevant technical standards currently in effect in Kenya, including but not limited to the Road Design Manual and the Standard Specifications for Roads and Bridges. Where technical standards for Kenya are not available, alternative equivalent standards from other countries may be accepted by the Employer.
6. STAFF AND LABOUR		
Engagement of Staff and Labour	6.1	*Add new paragraph at end of Sub-Clause 6.1* The Contractor shall comply with Laws of Kenya relating to employment of local staff and labour including Subcontractors with appropriate qualification and experience.
Working Hours	6.5	*Add new paragraph at end of this Clause* Working hours shall be observed by the Contractor as stipulated in the Labour Laws of Kenya. However, when deemed necessary to expedite the Works, overtime, night time or holiday working may be allowed by the Employer in consideration of the urgency and importance of this Project. The employer shall, and procure the relevant authorities issue necessary approvals or certificates to the Contractor to allow the Contractor's personnel can be exempted from the curfew or other movement restrictions orders, and provide necessary facility for the granting visas and work permits for the foreign engineers of the Contractor.

Measures against Insect and Pest Nuisance	6.12	*Add new Sub-Clause 6.12* The Contractor shall at all times take the necessary precautions to protect all staff and labour employed on the Site from insect nuisance, rats, and other pests and reduce the dangers to health and the general nuisance caused by the same. The Contractor shall provide his staff and labour with suitable prophylactics for the prevention of malaria and shall take steps to prevent the formation of stagnant pools of water. The Contractor shall comply with all the regulations of the local health authorities in these respects and shall in particular arrange to spray thoroughly with approved insecticide all buildings erected on the Site. Such treatment shall be carried out at least once a year or as instructed by the Employer's Representative.
Epidemics	6.13	*Add new Sub-Clause 6.13* In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders, and requirements as may be made by the government or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same.
Burial of the Dead	6.14	*Add new Sub-Clause 6.14* Any employee, who has met a fatal accident while engaged upon the works, shall be provided all necessary facilities for burial etc. as per the Laws of Kenya.
Drugs	6.15	*Add new Sub-Clause 6.15* The Contractor shall not, otherwise than in accordance with the Statutes, Ordinances, and Government Regulations or Orders for the time being in force, import, sell, give, barter, or otherwise dispose of any drugs, or permit or suffer any such importation, sale, gift, barter, or disposal by his subcontractors, agents, staff, or labour.
Arms and Ammunition	6.16	*Add new Sub-Clause 6.16* The Contractor shall not give, barter, or otherwise dispose of, to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.
Festivals and Religious Customs	6.17	*Add new Sub-Clause 6.17* The Contractor shall, in all dealings with his staff and labour, have due regard to all recognized festivals, days of rest, and religious and other customs.

8. COMMENCEMENT, DELAYS AND SUSPENSION

Commencement of Works	8.1	*Add new paragraph at beginning of Sub-Clause and change paragraph (b) into the following paragraph (b)* The Employer's Representative shall consult with the Contractor, review and approve the contractor's programme of works prior to issuance of the Letter of Commencement. (b) the Commencement Date shall be 28 days from date of Letter of Commencement issued by the Employer's Representative subject to approval of the Construction Document, right of access to the site having been given to the contractor and payment to Contractor of the first installment.
Time for Completion	8.2	*Add new paragraph at end of Sub-Clause 8.2* "The work shall be planned and executed as per provision of Sub-clause 8.3 with particular attention to the quarterly targets to be achieved as per this program in a period of 36 months from the Commencement Date".
Programme Submitted	8.3	*Add new paragraph at the end of Sub-Clause 8.3* Cash Flow Estimate A suitable estimate of funds requirements shall be provided by the

Contractor to manage cash flow operation.

Extension of Time for Completion	8.4 (d)	*Add (d),(e),(f) after (c)* exceptionally inclement weather.
	(e)	unforeseeable shortages in the availability of personnel or Goods caused by epidemic or governmental actions, or
	(f)	causes which, in the opinion of the Employer as proven by the Contractor, are beyond the control of the Contractor and are not due to any fault of the Contractor.
Delay Damages	8.7	The delay damages shall be 0.01% of the Contract Price per day and shall not exceed the maximum of three percent (3%) of the Contract Price.

10. EMPLOYER'S TAKING OVER

Taking Over of the Works and Sections	10.1	*Add the following sentence after the end of Sub-Clause10.1:* Substantial completion occurs when everything is completed other than off carriageway items(***Standard specifications (clause 107)***: delete the phrase "surface dressing" from clause 107 .). The works can be taken over partially or by sections by the Employer. The road shall only be taken over upon satisfactory acceptance completion in accordance to the approval which is issued by employer committee subject to acceptance tests for pavement and structures as per the Employers Requirements.

11. DEFECTS LIABILITY

Performance Certificate	11.9	Add the following paragraph after the first paragraph The Defects Notification Period shall be 12 calendar months.

13. VARIATIONS AND ADJUSTMENTS

Variation Procedure	13.3	*Add the following* The Variation and the adjustments to the Contract Price shall be not more than 25% of the Contract Price.Valuation for variations shall be based on the rates available in the Contract. In case rates cannot be derived in this manner, subject to the Laws of Kenya, the Employer's Representative shall have the option to set rates based on market value and shall include Contractor's overheads and profit.
Adjustment for changes in Legislation	13.7	*Delete the Sub-Clause 13.7 paragraph 1 and replace with the following* If, after the Base Date, there occur in Kenya changes to any National or State Statute, Ordinance, Decree or other law or any regulation or by-law of any local or other duly constituted authority, or the introduction of any such State Statute, Ordinance, Decree, Law, regulation or by-law which causes additional or reduced cost, to the Contractor, other than under sub clause 13.8 hereof in the execution of the Contract, such additional or reduced cost shall, after due consultation with both sides, be assessed and be paid by or credited to the Employer and the Contract Price adjusted accordingly.

Adjustments for Changes in Costs	13.8	Substitute new Sub-Clause 13.8 The Contract Price is to be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, by the addition or deduction of amounts determined by the formulae prescribed in this PC Clause. The adjustment to be applied to each installment payable to the Contractor. The formulae shall be of the following general type Pn=a+bLn/Lo+cEn/Eo+dMn/Mo+…….. Where: "Pn" is the adjustment multiplier to be applied to the estimated contract value in the relevant currency of the work carried out in installment "n". "a" is a fixed coefficient , stated in the Appendix ..... "b","c","d",...are coefficients representing the estimated proportion of each cost element related to the execution of the Works, are stated in Appendix ....., such tabulated cost elements may be indicative of resources such as labour, equipment and materials. "Ln","En","Mn"…are the current cost indices or reference prices for installment "n", each of which is applicable to cost element in Appendix ..... on the date 30 days prior to the submission day of installment. "Lo","Eo","Mo",…are the base cost indices or reference prices, each of which is applicable to cost element in Appendix ..... on the Base date.

14. CONTRACT PRICE AND PAYMENT

The Contract Price	14.1(b)	*Delete the Sub-Clause 14.1(b) and replace with the following:* The Contractor shall be exempted from payment of VAT, Import Declaration Fee, Import Duties and Railway Development Levy and the Employer shall apply for eligible tax exemption for the contractor from the relevant authority, subject to approval by the National Treasury in line with the Constitution and prevailing laws.
Advance Payment	14.2	*Add the following sub-clauses at the end:* The Advance Payment should be 20% of the Contract Price.The advance payment will be paid upon the date of effectiveness of the Contract and submission of an accepted advance payment guarantee. Deductions shall commence in the next interim Payment Certificate following that in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds twenty percent (20%) of the Accepted Contract Amount less Provisional Sums and completed by eighty percent (80%) total of all certified interim payments. In the event that an Advance Payment is granted, the following shall apply: (a) On signature of the Contract, the Contractor shall at his request, and without furnishing proof of expenditure, be entitled to an advance of upto maximum of 20% of the original amount of the Contract Sum. The advance shall not be subject to retention money. (b) No advance payment may be made before the Contractor has submitted proof of the establishment of deposit or of a directly liable guarantee satisfactory to the Employer in the amount of the advance payment. The guarantee shall be in the same currency as the advance. (c) Amortization of the lump sum advance shall be made by deductions from the Interim payments and where applicable from the balance owing to the Contractor.

The amortization shall begin when the amount of the sums due under the Contract reaches 20% of the original amount of the Contract. It shall have been completed by the time 80% of this amount is reached.

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

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

Where:

R = Amount to be amortized

A = Amount of the advance which has been granted

X^{1} = Amount of proposed cumulative payments as a percentage of the original amount of the Contract. This figure will exceed 20% but not exceed 80%.

X^{11} = Amount of the previous cumulative payments as a percentage of the original amount of the Contract. This figure will be below 80% but not less than 20%.

With each amortization, the counterpart of the directly liable guarantee may be reduced accordingly.

Application for Interim Payments

14.3 *Add the following*

The Contractor shall provide first instalment guarantee to the Employer within 28 days after both the following conditions are fulfilled namely;

(i) signing of the Contract Agreement;
(ii) signing of the Individual Loan Facility Agreement between the National Treasury of Kenya and the financial institution(s) of China.

The percentage of first installment is 20% of Contract Price as stated in - Schedule of Payment. The first instalment will be paid upon the date of effectiveness of the Contract and effectiveness of the Credit Agreement signed by the financial institution(s) of China and the National Treasury of Kenya and acceptance letter issued by the Employer of a first installment guarantee.

The Contractor shall provide retention money guarantee for every schedule of payment simultaneously with the submission of every application of schedule of payment to the Employer.

The percentage of retention is 5%, as stated in the Appendix to Form of Bid. The limit of retention is 5% of the Contract Price, as stated in the Appendix to Form of Bid. The retention money may be substituted with a Retention Money Guarantee from a bank acceptable to the Employer. 50% of retention to be released at every taking over and the balance replaced by retention bank guarantee in respect of that section.

Schedule of Payments

14.4 *delete Sub-Clause 14.4 and replace with the following:*

The instalments of the Contract Price shall be paid in accordance to the Schedule of Payments.

Timing of Payment

14.7 *Substitute Sub-Clause 14.7 with the following:*

The Employer shall pay to the Contractor:

(a) The amount due to the Contractor under any Interim or Final Payment Certificate issued by the Employer's Representative pursuant to this Clause, or to any other term of the Contract, shall, be paid by the Employer to the Contractor as follows:
   (i) in the case of Interim Payment Certificates, within 56 days after the Contractor's interim statement has been submitted to the Employer's Representative.
   (ii) in the case of the Final Payment Certificate pursuant to Sub-Clause 14.11, within 28 days after the Final Statement and written discharge have been submitted to the Employer's Representative for certification.

Delayed Payment	14.8	*Delete Sub-Clause 14.8 paragraph 1 & 2 and replace with the following:* In the event of the failure of the Employer to make payment within the times stated in sub-clause 14.7 hereof, the Employer shall pay to the Contractor simple interest at **LIBOR (***London Interbank Offered Rate***)** plus 3% for United States Dollars and mean base lending rate as issued by the Central Bank of Kenya plus 3% for Kenya Shilling.
Payment of Retention Money	14.9	*Add the following:* After 14 days of issuing Taking-Over Certificate for the Works, the Contractor shall replace the previous Retention Money Guarantees with a new guarantee of 2.5% of the Contract Price, with a validity period up to 7 days after the end of Defects Notification Period.
Currencies of Payment	14.15	*Add the following:* The payments of the foreign currency portion shall be transferred into the Contractor's account in USD/Chinese Yuan Renminbi directly through the financial institution(s) of China. In exceptional circumstances where additional works results in increased costs, such additional costs shall be exclusively denominated in Kenya Shillings.
Income Taxes on Staff	14.16	Add new Sub-Clause 14.16 Staff shall be subject to income taxes as per the Laws of Kenya
Employer's Risks	17.3	*Add new paragraph at end of Sub-Clause 18.3(e)* (f)Epidemic.

18. INSURANCE

Insurance for Works and Contractor's Equipment	18.2	*Add following new paragraph at the end of Sub-Clause 18.2* The insurances shall indemnify a) the Employer and the Contractor against loss or damage as provided in the details of insurance annexed to these Conditions from the first working day after the Date of Commencement until the date of issue of the Taking Over Certificate in respect of the Works or any sections or a part thereof as the case may be; and b) the Contractor for his liability i) during the Defects Notification Period for loss or damage arising from a cause occurring prior to the commencement of Defects Notification Period. ii) caused by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Defects Notification Period.

It is the responsibility of the Contractor to notify the insurance company of any changes in the nature and extent of the Works and to ensure the adequacy of the insurance coverage at all times during the period of the Contract.

Insurance Against Injury to Persons and Damage to Property	18.3	*Add the following:* The Contractor shall effect and maintain the third party liability insurance with a limit of indemnity of KShs. 10,000,000 (Kenya Shillings Ten Million only) per occurrence, with the number of occurrences unlimited.

20. CLAIMS, DISPUTES AND ARBITRATION

Appointment of Dispute Adjudication Board	20.2	The DAB shall be three-member Board.
Arbitration	20.6	*Sub-Clause 20.6 items a, b and c after third line are deleted and replaced with following wording:* All disputes arising out of or in connection with the present contract shall be finally settled under the Nairobi Centre for International Arbitration Rules, 2015 (down-loadable from website http://ncia.or.ke/images/downloads/253-NairobiCentreforInternationalArbitration_Mediation_Rules2015.pdf) by three arbitrators appointed in accordance with the said rules. Further details are:

The Law Governing the Contract	Laws of the Republic of Kenya
The number of Arbitrators	Three (one for small disputes detailed hereunder)
The Place of Arbitration	Nairobi

SCHEDULE OF PAYMENTS

The Payment to the Contractor shall be made in accordance with the following Schedule:

No.	Date of Payment	Percent of Contract Price

Section X - Contract Forms

Table of Forms

FORM No. 1 - NOTIFICATION OF INTENTION TO AWARD

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FORM No. 7 - 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 thisNotification 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)

ProcuringEntity: *[insert the name of the Procuring Entity]* Contracttitle: *[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.]*

S/No.	*Name of Tenderer*	*Tender Price*	*Evaluated Tender Price*	*Comments if any*
1				
2				
3				
4				
5				
Etc				

3. **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.

1. **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.

2. **Standstill Period**

f) **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.

(i) 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 Contact 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 Worksknownas_____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 Contract Agreement,
   b) The Letter of Acceptance,
   c) The Tender Clarifications,
   d) The Fidic 1999 Conditions of Contracts for EPC/ Turnkey Projects (Part-II Particular Conditions)
   e) The Fidic 1999 Conditions of Contracts for EPC/ Turnkey Projects (Part-I General Conditions)
   f) The Employers Requirements,
   g) The Schedule of Payments,
   h) The Contract Tender,
   i) Non- Binding Bills of Quantities (for reference only),
   j) Specifications and Preliminary Design Drawings,
   k) Minutes of Contract Negotiations,
   l) The Performance Security and Third-Party Liability Policy.

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.

5. The Agreement shall come into full force and effect on the date the following conditions are satisfied

   - The Government of Kenya and the financial institutions (The EXIM Bank of China) have entered into the necessary credit agreement relating to provision of Financing for the Dualling Of Muthaiga-Kiambu-Ndumberi and Capacity Improvement of Muthaiga Pangani Underpass Project.

   - Duly Signed credit agreement entered by the National Treasury of Kenya and the financial institutions (The EXIM Bank of China) has been endorsed and certified by the Office of the Attorney General and Department of Justice of Kenya.

   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.

For and on Behalf of Kenya Urban Roads Authority (KURA)	For and on Behalf of
Signature _____ Name and Title_____ Date_____	Signature _____ Name and Title_____ Date_____
Signature _____ Name and Title_____ Date_____	Signature _____ Name and Title_____ Date_____

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. Further more, 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: Allitalicized 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. 5 - PERFORMANCE SECURITY OPTION 2– (Performance Bond)

*[**Note:** Procuring Entities are advised to use Performance Security–Unconditional Demand Bank Guarantee instead of Performance Bond due to difficulties involved in calling Bond holder to action]*

[Guarantor letterhead or SWIFT identifier code]

Beneficiary:_____*[insert name and Address of* Procuring

Entity*]* **Date:**_____*[Insert date of issue]* **PERFORMANCE**

BOND No.:_____

Guarantor: [*Insert name and address of place of issue, unless indicated in the letter head]*

1. By this Bond_____as Principal (hereinafter called "the Contractor") and_____] as Surety (hereinafter called "the Surety"), are held and firmly bound unto_____] as Obligee (hereinafter called "the Procuring Entity") in theamountof_____for the payment of which sum well and truly to be made in the types and proportions of currencies in which the Contract Price is payable, the Contractor and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly ands everally, firmly by these presents.

2 WHEREAS the Contractor has entered into a written Agreement with the Procuring Entity dated the day of, 20_____, for_____in accordance with the documents, plans, specifications, and amendments thereto, which to the extent here in provided for, are by reference made part hereof and are herein after referred to as the Contract.

3 NOW, THEREFORE, the Condition of this Obligation is such that, if the Contractor shall promptly and faithfully perform the said Contract (including any amendments thereto), then this obligation shall be null and void; otherwise, it shall remain in full force and effect. Whenever the Contractor shall be, and declared by the Procuring Entity to be, in default under the Contract, the Procuring Entity having performed the Procuring Entity's obligations there under, the Surety may promptly remedy the default, or shall promptly:

1) Complete the Contract in accordance with its terms and conditions; or

2) Obtain a tender or tenders from qualified tenderers for submission to the Procuring Entity for completing the Contract in accordance with its terms and conditions, and upon determination by the Procuring Entity and the Surety of the lowest responsive Tenderers, arrange for a Contract between such Tenderer, and Procuring Entity and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the Balance of the Contract Price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "Balance of the Contract Price," as used in this paragraph, shall mean the total amount payable by Procuring Entity to Contractor under the Contract, less the amount properly paid by Procuring Entity to Contractor; or

3) Pay the Procuring Entity the amount required by Procuring Entity to complete the Contract in accordance with its terms and conditions upto a total not exceeding the amount of this Bond.

4 The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

5 Any suit under this Bond must be instituted before the expiration of one year from the date of the issuing of the Taking-Over Certificate. No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Procuring Entity named here in or the heirs, executors, administrators, successors, and assigns of the Procuring Entity.

6 In testimony where of, the Contractor has here unto set his hand and affixed his seal, and the Surety has caused these presents to be sealed with his corporate seal duly attested by the signature of his legal representative, this day _____of_____20_____.

SIGNED ON_____on behalf of_____

By_____in the capacity of_____

In the presence of

SIGNED ON_____on behalf of_____

By_____in the capacity of_____

In the presence of

FORM NO. 6 - ADVANCE PAYMENT SECURITY

[Demand Bank Guarantee] *[Guarantor letterhead or SWIFT*

identifier code] [Guarantor letterhead o rSWIFT identifier code]

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_____(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 th eWorks; 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_____dayof_____,2_____,[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."*

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 afte rcalled" 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 upto 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: Allitalicized text (including foot notes) 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 second half of the Retention Money.*

[2] *Insert a date that is twenty-eigh tdays after the expiry of retention period after the actual completion date of the contract. 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.*

BIDDING DOCUMENT
VOLUME 1B- (Bill of Quantities)

PREAMBLE

1. The Bill of Quantities shall form part of the Contract documents and is to be read in conjunction with Instructions to Bid, Conditions of Contract, Specifications and Drawings.

2. The brief description of the items in the Bill of Quantities is purely for the purpose of identification, and in no way modifies or supersedes the detailed description given in the Conditions of Contract and specification for the full direction and description of work and materials.

3. The Quantities set forth in the Bill of Quantities are estimated and provisional representing substantially the work to be carried out and given to provide a common basic for bidding and comparing the bids. There is no guarantee to the Contractor that he will be required to carry out all the quantities of work indicated under any one particular item or group of items in the Bill of Quantities. The basic of payment shall be the Contractor's rates and the quantities of work actually done in fulfilment of his obligation under the Contract.

4. The basic rates for labor, materials and equipment under dayworks shall cover all direct costs to the Contractor, including (but not limited to) the amount of wages paid to such labor, transportation time, overtime, subsistence allowances, Contractor's profit, overheads, superintendence, liabilities, and insurances and allowances to labor, time keeping, and clerical and office work, the use of consumable stores, water, lighting, and power; the use and repair of stagings, scaffolding, workshops, and stores, portable power tools, manual plant, and tools; supervision by the Contractor's staff, foremen, and other supervisory personnel; and charges incidental to the fore goingand any sums paid to or on behalf of such labor for social benefits in accordance with Kenyan law.

5. The basic rates under dayworks will be payable in local currency only.

6. In calculating payments due to the Contractor for the execution of day work, the hours for labor will be reckoned from the time of arrival of the labor at the job site to execute the particular item of day work to the time of return to the original place of departure, but excluding meal breaks and rest periods.

7. Only the time of classes of labor directly doing work ordered by the Engineer and for which they are competent to perform will be measured. The time of gangs (charge hands) actually doing work with the gangs will also be measured but not the time of foremen or other supervisory personnel.

8. The prices and rates inserted in the Bill of Quantities will be used for valuation of the work executed and the Engineer will measure the whole of the works executed in accordance with this Contract.

9. A price or rate shall be entered in link against every item in the Bill of Quantities with the exception of items which already have provisional sums affixed thereto. The bidders are reminded that no "nil" or "included" rates or "lump-sum" discounts will be accepted.

10. Provisional Sums (including Dayworks) in the Bill of Quantities shall be expended in whole or part at the discretion of the Engineer in accordance with Subclause 52.4 and Clause 58 of the Conditions of Contract.

11. The price and rates entered in the Bill of Quantities shall, except insofar as it is otherwise provided in the Contract , include all constructional plants to be used, labour, insurance, supervision, compliance, testing, materials, erection, maintenance of works overhead and profit, taxes and duties together with the general risks, liabilities and obligations set out or implied in the Contract

, transport, electricity and telephone, water, use and replenishment of all consumables, including those required under the Contract by the Engineer and his staff.

12. Work shall not be executed on a day work basis except by written order of the Engineer.

13. The Bill of Quantities, unless otherwise expressly stated therein, shall be deemed to have been prepared in accordance with the principle of the latest edition of the Civil Engineering Standard Method of Measurement (CESMM)

14. "Authorised" "Directed "or "Approved" shall mean the authority, direction or approval of the Engineer.

15. Unless otherwise stated, all measurement shall be net 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 Client representive.

16. Hard/rock materials in this Contract, shall be defined as the material which, in the opinion of the Engineer, require blasting, or the use of metal wedges and sledge hammers, or the use of compressed air drilling for their removal, and which cannot be extracted by ripping with a dozer tractor of at least 150 brake horse power (112 kilowatt) with a single rear–mounted hydraulic ripper Boulders of more than 0.2 m^3 occurring in soft materials shall be classified as hard material

17. 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.

18. 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.

19. The units of measurement and abbreviations tabulated below are used herein:

Unit	Abbreviation
Number	№
Millimetre	mm
Square millimetre	mm^2 / sq mm
Metre	m
Square metre	m^2 / sq m
Cubic metre	m^3 / cu m
Hectare	ha
Kilogramme	kg
Lump sum	LS
Prime Cost	PC
Tonne	Tonne
Metric ton (1000 kg)	t / tonne
Degrees centigrade	°C
Hour	h / hr
Week	wk
Month	mth
Horsepower	HP
Kilowatt	KW

DUALLING OF MUTHAIGA-KIAMBU-NDUMBERI (B32) ROAD

TENDER NO:

SUMMARY OF BILLS OF

BILL	DESCRIPTION	AMOUNT (KES)
1	BILL № 1: PRELIMINARY AND GENERAL SUPERVISORY/SUPPORT SERVICES	
4	BILL № 4: SITE CLEARANCE AND TOP SOIL STRIPPING	
5	BILL № 5: EARTH WORKS	
7	BILL № 7: EXCAVATION AND FILLING FOR STRUCTURES	
8	BILL № 8: CULVERTS AND DRAINAGE WORKS.	
9	BILL № 9: PASSAGE OF TRAFFIC	
12	BILL № 12: NATURAL GRAVEL FOR SUBBASE	
13	BILL №13: GRADED CRUSHED STONE	
14	BILL № 14: CEMENT AND LIME TREATED MATERIAL	
15	BILL № 15: BITUMINOUS SURFACE TREATMENTS AND SURFACE DRESSING	
16	BILL OF QUANTITIES: № 16 BITUMINOUS MIX BASES BINDER COUSES AND WEARING COURSES	
17	BILL № 17: CONCRETE WORKS	
19	BILL OF QUANTITIES: № 19 STRUCTURAL STEEL	
20	BILL № 20: ROAD FURNITURE	
21	BILL OF QUANTITIES: № 21 Miscellaneous Bridge Works	
22	BILL № 22: DAYWORKS (See Standard Specification)	
24	BILLS No 24. LED STREET LIGHTING	
25	BILL № 25: ENVIRONMENTAL MITIGATION MEASURES	
26	BILL № 26: HIV/AIDS AWARENESS	
27	ROAD SAFETY AWARENESS CAMPAIGN	
SUB TOTAL A		
Add of 5% for Contingencies		
SUB TOTAL B		
GRAND TOTALCARRIED TO FORM OF TENDER		

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
	NOTE; The following items for housing, offices and laboratory for the Engineer (Items 1.01 - 1.07) shall be deemed to include all costs involved in providing and maintaining such buildings, including furniture, fittings and access thereto and for the provision of security, heating, lighting, power, water, sewage and refuse disposal, as required for the duration of the contract. The provision may include renting/hiring.				
1.01	Accommodation for the Engineer and his Staff				
	Provision of accommodation to Engineer's Staff as provided for in the Book of Drawings and detailed in the Specifications for the duration of the contract				
	(a) Engineer's senior staff				
	(i) Type I houses	No.	2		
	(ii) Type II houses	No.	3		
	(b) Engineer's junior staff				
	(iii) Type III houses	No.	6		
	(iv) Type IV houses	No.	6		
	(iii) Type V houses	No.	7		
1.02	Main Office for the Engineer				
	Provide and maintain for the duration of the contract Engineer's main office as shown in the Book of Drawings and detailed in the Specifications - Minimum usable space area - 300m2	No.	1		
	Main Laboratory for the Engineer				
1.03	Construct and maintain for the duration of the contract Engineer's main Laboratory as shown in the Book of Drawings and detailed in the Specifications	No.	1		
1.04	Provide and maintain for the duration of the contract furniture and equipment for the Engineer's office. Further provide for interoffice intercom communication and internet services for the duration of the contract	Lump sum	1		
1.05	Provide and maintain for the duration of the contract survey equipment for the Engineer's use in the project include for callibration and to be as detailed in the Specifications.	Lump sum	1		

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
1.06	Provide and maintain for the duration of the contract Laboratory furniture and equipment. Rates to include periodic callibration of requisite equipment.	Lump sum	1		
1.07	Allow for laboratory consumables, third party testing services and calibration	PC Sum	1		
1.08	E.O. item 1.07 for contractor's overheads and profit	%	15		
1.09	Provide with driver and maintain Four (4) brand minimium new 3.0 litre 4-wheel drive, 5 door utility vehicles (new) or similarly approved with all relevant security and safety features for the exclusive use of the Engineer inclusive of the first 4000 km per vehicle month to revert to the Contractor at the end of the Contract. The vehicles are subject to approval by the Engineer	Veh. Mth	210		
1.10	E.O. item 1.09 for mileage over 4000 km per vehicle month	km	272,000		
1.11	Provide with driver and maintain Five (5) minimum 2.5 litre 4-wheel drive double cab vehicles brand new or similarly approved with all relevant security and safety features for the exclusive use of the Engineer inclusive of the first 4000 km per vehicle month to revert to the Contractor at the end of the Contract. The vehicles are subject to approval by the Engineer	Veh. Mth	288		
1.12	E.O. item 1.11 for mileage over 4000 km per vehicle month	km	544,000		
1.13	Provide with driver and maintain two (2) minimum 2.2 litre 4-wheel drive, single-cab pick up vehicle (with canvas pickup cover) or similarly approved with all relevant security and safety features for the exclusive use of the Engineer inclusive of the first 4000 km per vehicle month to revert to the Contractor at the end of the Project. The vehicles are subject to approval by the Engineer	Veh. Mth	72		
1.14	E.O. item 1.13 for mileage over 4000 km per vehicle month	km	70000		
1.15	Provide with driver and maintain one (1) minimum 4.0 litre 33-seater minibus or similarly approved with all relevant security and safety features for the exclusive use of the Engineer inclusive of the first 4000 km per vehicle month to revert to the Contractor at the end of the Project. The vehicles are subject to approval by the Engineer	Veh. Mth	36		

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
1.16	E.O. item 1.15 for mileage over 4000 km per vehicle month	km	70000		
1.17	Allow a provisional sum for the Engineers miscellaneous account to be spent in whole or part as directed by the Engineer against receipts.	Prov. Sum	1		50,000,000
1.18	E.O. item 1.17 for contractor's overheads and profit	%	15		
1.19	Provide, erect and maintain publicity sign as directed by the Engineer.	№	8		
1.20	Provisional sum for relocation of services	Prov. Sum	1		300,000,000
1.21	E.O. item 1.20 for contractor's overheads and profit	%	15		
1.22	Allow for attendance to the Engineer for the entire duration of the contract in accordance with Clause 137 of special specifications	PC Sum	1		100,000,000
1.23	E.O. item 1.22 for contractor's overheads and profit	%	15		
1.24	Allow a provisional sum for to the Engineer's staff mobile phone airtime and out of office internet charges	Prov. Sum	1		5,000,000
1.25	E.O. item 1.24 for contractor's overheads and profit	%			
1.26	Allow for procurement of 2 No. Digital Cameras and 1 No Video Camera for site progress photography and recording to revert to the Employer at the end of the Contract	Item	1		
1.27	Allow provisional sum for a stage by stage Project Documentary (Both Video and Still Photographs)	Prov. Sum	1		
1.28	E.O. item 1.29 for contractor's overheads and profit	%			
1.29	Provisional sum for confirmatory Geotechnical Investigations	Prov. Sum	1		10,000,000
1.30	E.O. item 1.31 for contractor's overheads and profit	%			
1.31	Allow for Training of Engineer's Staff	PC Sum	1		8,000,000
1.32	E.O. item 1.31 for contractor's overheads and profit	%			

Total of Bill № 1 carried forward to summary page					-

BILL № 4: SITE CLEARANCE AND TOP SOIL STRIPPING					
Item	Description	Unit	Quantity	Rate (Kshs)	Total (Kshs)
	No separate payments shall be made for haulage and the cost of such shall be included in the rates and/or prices.				
4.01	Clear site on road reserve including removal of trees of all sizes, hedges, bushes and other vegetation and other deleterious materials, grub up stumps and roots and backfilling of holes left by removal of stumps and roots in accordance with the Specifications, as shown in drawings and as directed by Engineer.	Ha.	128		
4.02	Topsoil removal	m3	255,013		
4.03	Dismantling of structures on roadway including sorting out the dismantled material for re-use and disposal of unserviceable material complete with leads and lifts as instructed by the Engineer and utilizing the serviceable material free of cost in permanent works.				
	(a) Plain concrete	m3	2,000		
	(b) Reinforced concrete	m3	1,000		
	(c) Masonry ~Structures	m2	10,000		
	(d) Bituminous pavement	m3	6,510		
	(e) Granular pavement	m3	39,060		
	(d) Steel girders	m	200		
4.04	Excavate, remove and dispose existing concrete pipe culverts including the inlet and outlet structures as directed by the Engineer.				
	(a) Diameter 300-600mm	m	1,000		
	(b) Diameter 900-1200mm	m	750		
	(c) Diameter >1200mm	m	250		
4.05	Dismantling of existing Armco Pipe Culverts and store for re-use as shall be directed by the Engineer.	m	50		
4,06	Dismantle existing guardrails including posts and store them at the nearest yard.	m	1,000.00		
Total of Bill № 4 carried forward to summary page					-

BILL № 5: EARTH WORKS					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
	No separate payments shall be made for haulage and the cost of such shall be included in the rates and/or prices.				
5.01	Fill in/construction of embankment, benching of shoulders with approved soft material obtained from borrow pits or from cuts, transporting to site, spreading, grading to required slope and compacting to 95% MDD - AASHTO.T99	m3	963,851		
5.02	As 5.01 but in hard material	m3	275,359		
5.03	As 5.01 but in rock	m3	32,512		
5.04	Cut to spoil in soft material	m3	460,444		
5.05	As 5.04 but in hard material	m3	116,782		
5.06	As in 5.04 but in Rock	m3	46,044		
5.07	Compacting original ground under cuts, embankments and benches to 95% MDD AASHTO T99	m3	207,732.00		
5.08	Extra over bill 5.07 for compacting 300mm below formation level in fill to 100% MDD (AASHTO T99) including compacting in two layers the 300mm subgrade forming part of fill (item 5.01). Subgrade class S5 to apply.	m3	258,496.50		
5.09	Compaction of ground below formation level in cut to 100% MDD (AASHTO T99) including removal of 150mm top layer to allow compaction of 150mm lower layer.	m3	12,000		
5.10	Improved subgrade in areas where subgrade of class more than S5 is required.	m3	343,883		
5.11	Excavation in swamps including stock piling, loading, transportation and disposal or re-use as would be directed by the Engineer	m3	237,434		
5.12	Provide, lay and compact rock fill to swamps as specified or as directed by the Engineer	m3	86,816		
5.13	Provide filter fabric under, over or around rockfill	m2	164,725		
5.14	Provide and lay Geo-grid where instructed by engineer.	m2	12,000		
Total of Bill № 5 carried forward to summary page					

BILL № 7: EXCAVATION AND FILLING FOR STRUCTURES					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
	No separate payments shall be made for haulage and the cost of such shall be included in the rates and/or prices.				
7.01	Excavate in soft material to any depth for structures including excavation, compaction, backfilling and removal of excavated material to specifications	m3	360,562		
7.02	River training including providing and laying boulders apron on river bed for protection against scour with stone boulder weighing not less than 40kg each complete as per drawing and technical specification	m3	21,027		
7.03	Extra over 7.01 and 7.02 for excavation in hard matreial	m3	81,369		
7.04	Provide, place and compact selected granular back fill material behind structures to any depth as indicated in the drawings and Technical Specifications or as directed by the Engineer.	m3	57,604		
7.05	Provide and place porous filter material as indicated in the drawings and as per specifications or as directed by the Engineer.	m3	32,500		
7.06	Provide and place selected granular fill material	m3	1,000		
7.07	Provide and lay stone pitching as per specifications to lines and extents shown in the drawings or as directed by the Engineer	m2	7,567		
7.08	Extra over on Item No. 7.07 for grouting	m2	2,270		
7.09	Excavate for gabions in soft material	m3	239		
7.1	Extra over 7.09 for excavation in hard material	m3	24		
7.11	Provide and place gabion mesh as per specifications to the lines and extents shown in the drawings or as directed by the Engineer	m2	2,990		
7.12	Provide and place gabion mattresses as per specifications to the lines and extents shown in the drawings or as directed by the Engineer	m2	1,435		
7.13	Provide and place rock fill below structures, to gabions and gabion mattresses as per specifications or as directed by the Engineer.	m3	40,620		
7.14	Provide and place filter fabric behind structures and embankments as per specifications or as directed by the Engineer.	m2	80,014		

7.15	Provide and place rip -rap as per specifications or as directed by the Engineer	m3	19,378		
7.16	Provide and erect river gauging stations(linear) on the faces of the water structures at major selected rivers. Specification of gauges and their erection to be as per WARMA guidelines. The stations to be handed over to WARMA at end of the project.	No	5		
Total of Bill № 7 carried forward to summary page					

BILL № 8: CULVERTS AND DRAINAGE WORKS.					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
8.01	Excavate in soft material to any depth for pipe culverts, covered and subsoil drains, headwalls, wing walls, aprons, toe walls, channels, including support of trench sides, backfilling and compacting as specified or as directed by the the Engineer.	m3	200,055		
8.02	Excavate for inlet, outfall, mitre and catchwater drains	m3	7,000		
8.03	Extra over items 8.01 to 8.02 in hard material	m3	9,341		
8.04	Provide and compact selected backfill material	m3	11,441		
8.05	Provide and lay graded crushed stone aggregates in subsoil drains as per specifications or as directed by the Engineer.	m3	324		
8.06	Provide and place filter fabric to rock fill and subsoil drains	m2	1,800		
8.07	Provide and place dia. 150mm perforated pvc subsoil pipe drains as per specifications or as directed by the Engineer.	m	500		
8.08	Provide, lay and compact rock fill below culverts and lined drains	m3	12,244		
8.09	Provide, lay and joint 900 mm I.D. reinforced concrete pipes	m	4,399		
8.1	Provide, lay and joint 1200 mm I.D. reinforced concrete pipes	m	839		
8.11	Provide, lay and joint 600 mm I.D. reinforced concrete pipes	m	2,321		
8.12	Provide, lay and joint 450 mm or less I.D. Reinforced Cement Concrete pipes for Service ducts as per the drawings or as instructed by the Engineer	m	1,800		
8.13	Provide and place class 15/20 concrete lining to side drains and outfall channels, bed concrete for side drains, kerbs, pipe culverts etc as directed by the Engineer	m3	9,846		
8.14	Provide, place and compact class 25(20) concrete for scour checks, headwalls, wingwalls, aprons, covered drains and toe walls to access and cross pipe culverts including all formwork as shown in the drawings.	m3	31,670		
8.15	Excavate as necessary, provide all materials and construct cast in-situ concrete chutes in accordance with the drawings on high fills where instructed by the Engineer.	m3	300		

8.16	Provide and lay 150mm thick grouted stone pitching with ratio 1:4 cement to motor, on culvert inlets and outlets and where directed by the Engineer	m2	3,600		
8.17	Provide and joint 600 mm diameter precast concrete invert block drain (IBD) channels with two double side precast side slabs of 600x225x75 mm as lining for side drain including bedding and backfilling with selected material as directed by the Engineer.	m	8,738		
8.18	Provide materials and construct Longitudinal service duct in class 25/20 concrete as shown in the drawings and as per specifications.	m	21,000		
8.19	Provide all materials and construct Gabion Scour Checks as shown in the drawings or as directed by the Engineer.	m	254		
	Reinforcement				
	Provide, cut, bend and fix as per specifications or as directed by the Engineer the following items of reinforcement				
8.2	Provide and place A252 fabric mesh reinforcement or equivalent for surround, wing walls, aprons, toe, wall, covered drain, inlets and oulets and as directed by the Engineer	m2	28,692		
8.21	High tensile bar reinforcement to BS 4461	Tonne	2,903		
Total of Bill № 8 carried forward to summary					

BILL № 9: PASSAGE OF TRAFFIC					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
	No separate payment shall be made for the overhaul of the material and the cost of such haulage shall be included in the rates and or prices.				
9.01	Provide and maintain the signs and barriers for safe passage of traffic				
	(i) Signages	No.	370		
	(ii) Barricades - drum type	No.	175		
	(iii) Barricades - steel portable	No.	420		
	(iv) Flashing light arrow panels	No.	40		
9.02	Allow for the passage of traffic through the works	km	13		
9.03	Construct and maintain deviations including construction of embankment as necessary to formation level using imported material with no extra payment for haulage, provision of temporary cross drainage structures, signs and barriers and reinstatement of deviations	km	25		
9.04	Surface dressing with chippings 6/10mm including bitumen 80/100 seal coat	m^3	2,567		
9.05	Execute site clearance, earthworks, drainage, gravel wearing course with bituminous seal, temporary cross drainage structures, maintenance and reinstatement for the access roads	km	30		
9.06	allow for maintenamce of existing road ahead of the works	km	35		
9.07	Allow for public notices in the popular media during the period of constructions as would be required.	no	12		
Total of Bill № 9 carried forward to summary					

BILL № 12: NATURAL GRAVEL FOR SUBBASE					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
	No separate payments shall be made for the overhaul of material and the cost of such haulage shall be included in the rates and or prices				
12.01	Provide, lay and compact natural gravel material for subbase	m3	26,602		
12.02	Provide, lay and compact natural gravel material for base	m3	20,431		
Total of Bill № 12 carried forward to summary					

BILL №13: GRADED CRUSHED STONE					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
	No separate payments shall be made for the overhaul of material and the cost of such haulage shall be included in the rates and or prices				
13.01	Provide and lay graded crushed stone for subbase	m3	118,753		
13.02	Provide and lay graded crushed stone for base	m3	24,806		
13.03	Remove existing asphalt and other pavement layers of the existing pavement by cold milling to depth instructed and transport the milled material for mixing as shall be instructed and reuse in pavement layers or asphalt layers as shall be instructed by the Engineer.	m3	25,200		
Total of Bill № 13 carried forward to summary					-

BILL № 14: CEMENT TREATED MATERIAL					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
14.01	Provide, transport and spread cement stabilizer to Graded Crushed Stone subbase and base layers as specified and/or as directed by the Engineer.	Tonne	2505.29		
14.02	Allow for mixing in cement stabilizer to Graded Crushed Stone subbase and base layers including compaction.	m3	86989.35		
14.03	Allow for curing and protection of treated sub- base and base layers as specified	m2	497082		
Total of Bill № 14 carried forward to summary					-

BILL № 15: BITUMINOUS SURFACE TREATMENTS AND SURFACE DRESSING					
ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	TOTAL (Kshs)
	No separate payments shall be made for haulage of bitumen or chippings and the cost of such haulage shall be included in the rates and/or prices				
15.01	prime coat . Prepare surface of carriageway, shoulders, bus bays, accesses and junctions, provide, heat and spray MC-30 cutback bitumen prime coat at a spary rate of 0.8-1.2 litre/m2	Lt	830,928		
15.02	K 1-70 Tack coat. Prepare surfaces, provide and spray K1-70 bitumen emulsion as tack coat to carriageway at a spray rate of 0.3-0.8 litres/m2 as directed by the Engineer	Lt	795,331		
15.03	80/100 Bitumen. Prepare surfaces, provide, heat and spray 80/100 penetration grade bitumen as binder for surface dressing at a spray rate of 0.8 -1.2 L/m2	Lt	830,928		
	Pre-Coated chippings.				
15.04	MC 30 for pre-coating chippings.	Lt	190,421		
15.05	Provide, spread and roll pre-coated chippings of size 10/14 mm at a spread rate of 80 -100m2/m3 covering carriageway and shoulders	m3	8,656		
Total of Bill № 15 carried forward to summary					

BILL № 16 BITUMINOUS MIX BASES BINDER COUSES AND WEARING COURSES					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
	Note: No haulage will be paid for bituminous mix bases and Asphalt Concrete (AC) wearing course and this rate should be included in the rates tendered				
16.01	Prepare surface ,provide, lay and compact 150mm thick,37.5 mm Superpave (AC type) DBM base extended to shoulders compacted to 98% Marshall & 95% Refusal. Binder to be used shall be 60/70 penetration grade bitumen.	m3	62,135		
16.02	Prepare surface, provide, lay and compact 50mm thick,19 mm Superpave (AC type) wearing course with 0.4% - 0.6% Anti-Rutting Additive (PR PLASRS) + Pre-coated 10/14 mm chippings extended to shoulders AC to be compacted to 98% Marshall & 95% Refusal.Binder to be used shall be 60/70 penetration grade bitumen.	m3	34,622		
Total of Bill № 16 carried forward to summary					

BILL № 17: CONCRETE WORKS					
DESCRIPTION		UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
ITEM					
17	Concrete Works				
	Concrete to Bridges, Box Culverts and Retaining Walls				
17.01	Provide, place and compact Class 15/20 Concrete blinding to foundation of piers, abutments, box culverts, Foot -Bridges and retaining walls as specified in the drawings or as directed by the Engineer.	m3	2,493		
17.02	Provide, place and compact Class 30/20 Cyclopean/plum concrete to foundation of piers & abutments, as specified in the drawings or as directed by the Engineer.	m3	1,659		
17.03	Provide, place and compact concrete Class 30/20 to foundation of piers, pile caps, abutments, approach slab, box culverts, Foot-bridges and retaining walls	m3	27,131		
17.04	Provide, place and compact concrete class 30/20 to walls of abutments, box culverts, retaining walls and deck slab	m3	83,255		
17.05	Provide, place and compact concrete Class 35/20 on the Deck slab and precast concrete girders as shown in the drawings or as directed by the Engineer.	m3	7,758		
	Form Work				
17.06	Provide, Erect and dismantle formwork to provide class F1 finish to main footings of piers, abutments walls and retaining walls	m2	70,624.00		
17.07	As item 17.06 but to provide formwork class F2 finish to vertical sides of piers, abutment walls and retaining walls	m2	148,135		
17.08	As item 17.06 but to provide formwork class F3 finish to soffit of Deck Slab and Girders[Including T- Girders ,Edge & Mid cross Transverse beams]	m2	48,186		
	Reinforcement				

	Provide, cut, bend and fix as per Specifications or as directed by the Engineer the following items of reinforcement				
17.09	High Yield Tensile reinforcement bars to specifications				
	a) diameter equal to or less than 16mm	Tonne	12,411.00		
	b) diameter greater than 16mm	Tonne	4,948.00		
17.10	Mild steel bars				
	a) diameter equal to or less than 16mm	Tonne	1,012.00		
Total of Bill № 17 carried forward to summary					

	BILL OF QUANTITIES: № 19 STRUCTURAL STEEL				
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
19.01	Design, submission of orders, fabrication drawings, details and supply of structural steel works including material bolts,cleats,nuts ,washers ,welding rods and all other fixings and erection requirements, priming, painting ,shear studs to Engineer's approval etc. complete as per drawings and standard specifications.				
(a)	Gantry Road Signs				
	Km 0+800; Approach to Thika Road, from Kiambu	Tonnes	20		
	Km 3+000; Approach to Tara rd intersection, Nairobi side	Tonnes	20		
	Km 4+000; Approach to Tara rd intersection, Kiambu side	Tonnes	20		
	Km 3+300; Tara Road-approach to intersection	Tonnes	12		
	Km 5+000; Approach to Northern bypass-Nairobi side	Tonnes	20		
	Northern bypass (Riuru side);	Tonnes	12		
	Northern bypass (Ruaka side);	Tonnes	12		
	Km 6+200; Approach to northern bypass-kiambu side	Tonnes	20		
	Km 9+200; Approach to KIST intersection-Nairobi side	Tonnes	20		
	Km 1+000; Approach to KIST intersection-Kamiti rd	Tonnes	12		
	Km 1+400; Approach to Kirigiti intersection-Kamiti side	Tonnes	12		
	Km 1+000; Approach to Kirigiti intersection-Banana side	Tonnes	12		
(b)	Foot bridges	Tonnes	3,729.00		
Total of Bill № 19 carried forward to summary					-

	BILL № 20: ROAD FURNITURE				
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
20A	Marker posts				
20A.01	Provide and fix precast road reserve boundary posts painted in white as shown in the drawings, specifications or as directed by Engineer	No.	357		
20A.02	Provide and fix reflectorized precast concrete Edge Marker Posts on the outer edge of shoulder as shown in the drawings, specifications or as directed by Engineer	No.	328		
20A.03	Provide and fix Kilometre marker posts as shown in the drawings, specifications or as directed by Engineer	No.	97		
20B	Permanent road signs				
20B.01	Provide and erect standard cautionary/warning road signs made of high intensity grade retro-reflective type sheeting (ASTM 9)complete as per drawing and technical specifications	No.	188		
20B.02	Provide and erect standard regulatory/mandatory road signs made of high intensity grade retro-reflective type sheeting (ASTM 9) complete as per drawing and Technical specifications.	No.	54		
20B.03	Provide and erect standard informatory road signs made of high intensity grade retro-reflective type sheeting complete as per drawing and Technical specifications.	No.	43		
20B.04	Provide and erect non-standard informatory signs				
	i) less than 1m sq	No.	25		
	ii) >1m sq - 2m sq.	No.	20		
	iii) >2m sq - 3m sq.	No.	55		
	iv) >3m sq - 4m sq.	No.	40		
	v) >4m sq - 5m sq.	No.	10		
	vi) >5m sq	No.	5		
	Road marking in yellow or white paint				
20B.05	Providing and laying hot applied reflectorized thermoplastic road marking compound in approved colour and shade (ASTM 9) for road marking on bituminous surface using fully automatic extrusion machine and using premelter for melting thermoplastic material including cleaning the surface of all dirt, dust, and other foreign matter, demarcation at site/premarking, finishing and managing the traffic control etc.complete. Marking to be done as per specifications, detailed drawings and as directed by the Engineer				

	i) white paint				
	(a) 100mm thick centreline-broken line(dual carriageway)	m2	1923		
	(b)100mm wide road edge-white	m2	17168.5		
	(c) Bus bays / Lay bys-200mm	m2	1198		
	(d) Give way lines-400mm	m2	893		
	(e) Pedestrian crossings-500mm	m2	635		
	(f) Direction arrows	m2	443		
	ii) yellow paint				
	(a) 100mm thick centreline-yellow	m2	480		
	(b) Chevron markings	m2	300		
20B.06	Provide and erect single sided single head flexi-beam guardrails complete with steel posts or equivalent concrete posts, spacers, nuts, bolts, Swareflex ART 3240 Gaurd Rail reflectors installed after every four (4) metres and fittings as shown in the drawings, specifications or as directed by the Engineer	m	16747.5		
20B.06A	Provide and erect fabricated steel road separation barrier in sections as per the drawing complete with steel stantions anchored into the ground . The steel sections to be appropriately painted or galvanised to protect them against rusting. The height to be approximately 1.2 m high from the top of the kerb. Each section to be approximately 1.5m wide or as shall be instructed on site. Appropriate relectorization to be undertaken.	m	13035		
20B.07	Provide and lay precast concrete kerbs, as shown in the drawings, specifications or as directed by the Engineer.				
	i) Precast high barrier kerbs				
	(a) Straight kerbs	m	89,280		
	(b) Radial kerbs	m	8928		
	(c) Quadrants	no.	100		
	ii) Precast channels				
	(a) Straight channels	m	143853		
	(b) Radial channels	m	10158		
	iii) Precast mountable kerbs				
	(a) Straight kerbs	m	2000		
	(b) Radial kerbs	m	400		
	(c) Quadrants	m	200		
	iv) Precast footpath edging	m	37200		
Total carried forward to next page					

	BILL № 20: ROAD FURNITURE				
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	
Total brought forward to next page					
20B.08	Provide all materials and erect rumble strips as shown in the drawings, specifications or as directed by the Engineer	m	440		
20B.09	Provide all materials and construct road humps (speed humps) with AC Type 1 , complete with road markings as shown in the drawings or as directed by the Engineer.	m	343		
20B.09	Provide and plant approved trees, inclusive of transport ,excavation, provision and backfill with manure and topsoil, watering and replacement of seedlings as necessary as shown in the drawings or as directed by the Engineer.	m	1116		
20B.10	Provide and plant approved flowers and shrubs, inclusive of transport ,excavation, provision and backfill with manure and topsoil, watering and replacement of flowers and shrubs as necessary as shown in the drawings or as directed by the Engineer.	no.	2232		
20B.11	Provide and fix aluminium casted refelective studs (Cat's eyes) of size 100 mm x 100 mm at the base with zinc coated nails of size 12 mm dia. of 120 mm long having both sides (dual direction) high impact ABC 3 No. of eyes of 16 mm dia on both side containing 7 beads each, a total of 42 beads in retro reflective.	no.	2690		
20B.12	Provide and lay 60mm thick precast concrete paving blocks on footpaths and any other locations as shown in the drawings or as directed by the Engineer.	m2	134475		
20B.13	Excavate in any material, provide all materials, supply and install bollards with class A black circular hollow pipe sections 6mm thick, with brackets welded at base and filled with compacted concrete class 15/14 and 1:3 cement mortar conical coping on top the pipe to the Engineer's satisfaction. The pipes shall be 1500mm long with 1000mm protruding above the ground and the lower 500mm embed in concrete 15/20. The part above ground shall be painted black with two (2) 300mm white/yellow reflective strips.				
	(a) 150mm diameter	no.	2,000		
	(b) 200mm diameter	no.	1000		
20.14	Allow a provisional sum of KES 20, 000,000.00 for road side social amenities, landscaping and beautification.	PC Sum	1		20,000,000
20.15	Extra over item 20.14 for overhead and profit	%	15%		

					-
20.16	Provide and erect awareness bill boards with an area greater than 5sqm at locations to be directed by the Engineer.	no.	3		-
Total of Bill № 20 carried forward to summary					-
	BILL№ 21 Miscellaneous Bridge Works				
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
21.01	Supply, fit and fix 350x300x40 mm (complete with 32 mm dowel and cap) in position true to line and level Elastometric laminated rubber bearings complete with all accessories as per drawing and MOR specifications	No.	256		
21.02	Ditto but free bearings	No.	256		
21.03	Provide and place into position 50 mm diam pipe handrails on bridge structures spot welded to guard rail steel posts as shown in the drawings or as dirceted by the Engineer.	m	1,600		
21.04	Provide and erect flex-beam guardrails complete with steel posts, spacers, nuts, bolts, Swareflex ART 3240 Gaurd Rail reflectors installed after every four (4) metres and fittings as shown in the drawings, specifications or as directed by the Engineer	m	4,522		
21.05	Provide and install joint filler polystyrene or other approved filler as shown in the drawings or as directed by the Engineer.	m	1,138		
21.06	Provide and install expansion joints for bridges and box culverts as follows:				
	(i) Sliding finger-like type of expansion joint with structural steel and anchorage assembly complete as per the drawings and specifications including acceptance testing as specified, to be installed under the supervision of a specialist manufacturer.	m	899		
	(ii) 25mm joint with Φ25mm stainless steel dowel bars, sleeves, debonding agent and all other associated components in complete nature as indicated on the drawings or as directed by the Engineer	m	1,138		
21.07	Provide and install in position 100mm diameter UPVC drain pipes to deck slab as shown in the drawings or as directed by the Engineer.	No	488		

21.08	Provide and install in position 150mm diameter service duct in UPVC pipes as shown in drawings or as directed by the Engineer.	m	1,730		
21.09	Provide and install in position 75mm diameter UPVC pipe-weep holes through abutment wall, wing walls and retaining walls to provide drainage for rear of abutment as shown in the drawings and as directed the Engineer.	No.	16,837		
21.1	Provide and install filter fabric membrane for porous filter material (non-rotting) as shown in the drawings or as directed by the Engineer.	m2	4,494		
21.11	Waterproofing to structures:-Provide and apply two coats of bituminous emulsion or MC-30 cut back bitumen to all structural concrete surfaces in contact with fill material or cut soil surfaces as per specifications or as shall be directed by the Engineer.	m2	155,233		
21.12	Construct Reinforced earth structures, together with the construction of earthworks in layers, assembly and erection of reinforcing element and placement of facia panels & geotechnical layers (as approved by Engineer) and all other associated components in complete nature as indicated on the drawings. The work shall also carry a warranty certification for maintaining structural/aesthetical integrity of the whole Reinforced Earth wall system for at least 20 years after the construction completion time. The rates shall include earth filling, geosynthetics panels, associated reinforcing bars, formwork and footing materials.				
	(i) Facia Pannels including reinforcement and drainage ancillaries	m2	24,847		
	(ii) Backfilling with suitable porous filter material	m3	12,436		
	(iii) Class 30/20 Friction Slab	m	3,210		
	Bridge Piling Works				
21.13	Allow Lump sum for mobilisation of the pile Rig to any site within the project	Lumpsum	2		
21.14	Move and set-up piling rig at each pile position in a vertical direction. Rates to include site preparations, setting out and collar installation.	No	127		
21.15	Provide and install reinforced concrete cast in-situ dia. 800mm piles, inclusive of drilling, protection of shaft using bentonite, steel fixing,casting with concrete class 30/20. The rates to include pile head preparations for pile cap installation.				

	(i) Depth not exceeding 10m	m	1270		
	(ii) Depth exceeding 10m	m	1270		
21.16	Load Tests on piles as specified In advance of the main piling operations, testing of piles to two and half times (x2.5) the working load of 2100KN	No.	2		
21.17	Pile Integrity Testing	pile			
21.17a	Undertake pile integrity test through Crosshole Sonic Logging (CSL) and or low strain testing as per the specifications and directed by the Engineer.	No.	80		
21.17b	Carry out High Strain Dynamic Load test for bored cast insitu pile as directed by the Engineer and per the specification.	no	8		
21.18	Provide Provisional Cost Sum for construction of water borne toilets for road users within the locality foot bridges including provision of water , waste digestors and caretaker room and other facilities	no	15	10,000,000	
21.19	E.O. item 21.18 for contractor's overheads and profit	%	15		
21.20	Provide a provisional sum for construction of Monkey crossing Bridges	PC SUM	1		20,000,000
21.21	E.O. item 21.19 for contractor's overheads and profit	%	15		
Total of Bill № 21carried forward to summary					

	BILL № 22: DAYWORKS (See Standard Specification)				
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	
	PLANT				
22.01	Crawler Dozer and Hydraulic Ripper				
	a) 100-135 Kw rated flywheel power	Hr	110		
	b) 136-185 Kw rated flywheel power	Hr	110		
	c) 186-250 Kw rated flywheel power	Hr	110		
22.02	Motorized rubber tyred single engine scrapers				
	a) Up to 16m3 heaped capacity	Hr	220		
	2	Hr	220		
22.03	Motorized rubber tyred twin engine scrapers				
	a) Up to 16m3 heaped capacity	Hr	110		
	b) 17-26 m3 heaped capacity	Hr	110		
22.04	Motor Graders				
	a) 80-110 Kw rated flywheel power	Hr	220		
	b) 111-120 Kw rated flywheel power	Hr	220		
	c) 121-160 Kw rated flywheel power	Hr	220		
22.05	Rollers Towed vibratory including tractor				
	a) 6.5 -8.8t unballasted wt+	Hr	220		
	b) 8.6- 11.7 t unballasted wt	Hr	220		
22.06	Road Roller deadweight (Steel Three Wheel)				
	a) 6.5 -8.8t unballasted wt	Hr	220		
	b) 8.6- 11.7 t unballasted wt	Hr	220		
22.07	Roller rubber tyred self propelled				
	a) up to 1t per wheel	Hr	220		
	b) 1.1t -2.0t per wheel	Hr	220		
22.08	Roller Vibratory single roll Rubber tyred 8.3-10.5 t unballasted weight	Hr	220		
22.09	Vibrating plate compactor 114-200 kg operating weight	Hr	220		
22.1	Compressor rated by normal delivery of free air per minute complete with all tools				
	a) 6.0-7.4 m3/mm	Hr	110		
	b)7.5-9.7m3/min	Hr	110		
	c) 9.8-25.5m3/min	Hr	110		
22.11	Mobile rubber tyred rough terrain crane 23-40 t max working load	Hr	110		

22.12	Tracked Excavator Cranes				
	a) 20-28t max working load	Hr	110		
	b) 28.1-36.1t max working load	Hr	110		
	c) 36.1-56t max working load	Hr	110		
22.13	Small dumpers 751kg-1.2t max rated payload	Hr	110		
22.14	Excavators hydraulic wheeled dual purpose				
	a)0.6-0.8m3 rated bucket capacity	Hr	220		
	b)0.81-1.0m3 rated bucket capacity	Hr	220		
Total carried forward to next page					-
ITEM	DESCRIPTION	UNIT	QUANTITY		TOTAL (Kshs)
	Total brought forward from previous page				-
	Pumps (Inclusive of all hoses)				
22.15	a) 50-76mm delivery	Hr	110		
	b) 77-101mm delivery	Hr	110		
22.16	Rubber tyred tractors including trailer. 50-70kw rated flywheel power	Hr	110		
22.17	Wheeled loaders 4X4 articulated				
	a) 1.5-2.0 m3 SAE rated capacity	Hr	220		
	b) 2.01-3m3 SAE rated capacity	Hr	220		
	c) 3-5 m3 SAE rated capacity	Hr	220		
22.18	Crawler Loaders				
	a) 0.8-1.3m3 SAE rated capacity	Hr	220		
	b) 1.31-1.99 m3 SAE rated capacity	Hr	220		
	c) 2-2.5 m3 SAE rated capacity	Hr	220		
22.19	Concrete mixers (wet capacity)				
	a) up to 100 litres	Hr	220		
	b) 101-200 litres	Hr	220		
	c)201-300 litres	Hr	220		
22.2	Concrete poker vibrator	Hr	220		
22.21	Lorries – Flatbed				
	a) up to 7.5t gross vehicle weight	Hr	220		
	b) 7.6-12.0t gross vehicle weight	Hr	220		
22.22	Lorries – Tippers				
	a) up to 11t gross vehicle weight	Hr	220		
	b) 11-17t gross vehicle weight	Hr	220		
	c) 17.1- 25t gross vehicle weight	Hr	220		
22.23	Van, Pickup or similar utility vehicle				

	a) up to 1 t carrying capacity	Hr	220		
	b) 1.1-2.6 t carrying capacity	Hr	220		
22.24	Self propelled water or fuel tanker				
	a) 3500-4550 litre capacity	Hr	220		
	b) 4551-7000 litre capacity	Hr	220		
	c) 7001-12000 litre capacity	Hr	220		
22.25	Pressure Bitumen distributor				
	a) 3500-4550 litre capacity	Hr	220		
	b) 4551-9000 litre capacity	Hr	220		
22.26	Mechanical Broom	Hr	220		
22.27	LABOUR				
	a) Unskilled Labour	Hr	8,000		
	b) Plant Operator	Hr	4000		
	c) Driver	Hr	4,000		
	d)Foreman	Hr	4000		
	MATERIALS				
22.32	Aggregates for Concrete				
	a) Fine	m3	200		
	b) coarse	m3	400		
22.33	Shuttering Timber				
	a) F1 finish	m2	250		
	b) F2 finish	m2	160		
	c) F3 finish	m2	160		
	Total carried forward to next page				-
ITEM	DESCRIPTION	UNIT	QUANTITY		TOTAL (Kshs)
	Total brought forward from previous page				-
22.37	Gabion mesh, size 1.0m x 1.0m x1.0m	m2	2,000		
22.38	Stone for gabions	m3	364		
22.39	Dynamite stick explosives	kg	50		
22.4	Explosive fuse	m	250		
22.41	Detonators	№	30		
22.42	Cement	Tonnes	15		
22.43	Lime	Ton	15		

		nes			
22.44	Reinforcement steel				
	(a) Mild steel	Tonnes	15		
	(b) High yield steel	Tonnes	5		
22.45	BRC Mesh- A193	m2	1000		
22.46	MC-30 Cutback bitumen	Lts	8000		
22.47	K1-60 Emulsion bitumen	Lts	5000		
22.48	80/100 Straight run bitumen	Lts	5000		
22.49	60/70 Straight run bitumen	Lts	5000		
22.5	Kerosene	Lts	2000		
22.51	Diesel	Lts	2000		
22.52	Petrol	Lts	2000		
22.53	Red oxide under coat paint	Lts	100		
22.54	Oil paint for metalic surfaces	Lts	100		
22.55	Welding rods of any gauge	Kgs	50		
22.56	50mm pipe hand rails	m	100		
22.57	Guard rails	m	250		
22.58	Bolts and fasteners of any size	no.	500		
Total of Bill № 22 carried forward to summary					-
BILLS No 24. LED STREET LIGHTING					
Item	DESCRIPTION	UNIT	QTY		TOTAL
No.					KSHS.
A)	Supply, deliver, install and set to work the following:-				
	10 metre Streetlighting installation				
24.1	(a)10m concrete streetlighting column made from reinforced concrete complete with a single arm side entry bracket of	No.	1,883		-

	1.5m outreach as per Drg. No. SL 4 (3) all with all accessories				
	(b)10m concrete streetlighting column made from reinforced concrete complete with a Double arm side entry bracket of 1.5m outreach as per Drg. No. DL 4 (3) all with all accessories	No.	276		-
24.2	a)154W ultra High power LED streetlights with output of 13667lm as THORN dyna LED incorporating a NEMA photocell socket or approved equivalent which should be engraved to standard codes to be provided, State make and cat No. ……..……	No.	2,434		-
	b)114w LED tunnel luminaire. Electronic, fixed output control gear. Body: extruded aluminium, powder coated white. To be surface mounted to ceiling or wall for Underpass and foot bridges as Thorn GTLED 18L70 741 S or approved equivalent which should be engraved to standard codes to be provided. State make and cat No. ……..……	No.	250		-
24.3	(a)1.5mm2 twin with earth PVC insulated copper cable as manufactured by East african cables or approved equivalent	m	5,646		-
24.4	(a)pole mounted Metal control pillar as per Drg. SL 4 (2), with lockable facility for single phase service line	No.	99		-
24.5	(a) 4 way surface mounted Consumer unit with a 100 Amps DP intergral isolator as ABB or similar and approved by the engineer. State Make …….	No.	99		-
24.6	10 Amp single phase MCB's for item No. 6 above	No.	198		-
24.7	Blanking plates for item No. 6 above	No.	198		-
24.8	40Amp current operated earth leakages circuit breaker withrated leakage current of 0.5A. State Make …….	No.	99		-
24.9	40Amp Double pole contactor. State Make ……	No.	99		-
24.1	Photo cell kit, Photo cell socket and bracket. State Make ……	No.	2,533		-
24.11	2 core 16.0mm2 + 1x25mm2 XLPE Aluminum (aeriel bundled cable)	m	67,752		-

24.12	alluminium distribution connector	No.	3,764		-
24.13	secondary pole mounting bands with nylon alloy wireholder Heavy cup-base and strap to which clamp is rigidly assembled and electroplated. Insulator and strap-base are assembled with a solid-copper rivet. Two carriage bolts are wedged rigidly into the wireholder base.	No.	3,962		-
24.14	ABC dead end clamps (LV)	No.	198		-
24.15	ABC end caps 16mm-50mm	No.	198		-
24.16	Earthing comprising of a 6mm2 earth lead and 1800mm long by 15mm diameter copper earth electrode with a driving tip and clamp in a 300mm by 300mm by 300mm concrete manhole with removable cover	No.	570		-
	TOTAL FOR STREETLIGHTING INSTALLATION CARRIED FORWARD				-
Item	DESCRIPTION	UNIT	QTY	RATE	TOTAL
No.				KSHS.	KSHS
	Total brought forward from previous page				
	Supply, deliver, install and set to work the following:-				
B)	30 metre streetlighting mast installation				
24.17	30m polygonal steel galvanised highmast column made from Class "B" steel galvanised polygon cross section column, root mounted, continous taper to meet 30m mounting height requirement with luminaire assembly for 9No. 186W high power LED floodlights, pulleys, anchoring bolts and lowering steel ropes. The colunm to have a corrosion and rust proof finishing to Engineers Approval.	No.	4		
24.18	Electrical winch, heavy duty type, complete with an automatic torque limiter for raising and lowering the luminaire assembly and to be with remote operation capability. State make.	No.	4		
24.19	painting of the mast with reflective red/white/red arrangement to Kenya Civil Aviation Authority (KCAA)	item	4		

	requirements				
24.2	Three phase 25Amp cut-out complete with a 10A HRC fuse. State Make…….	No.	4		
24.21	186W ultra High power LED flood lights which should be engraved to standard codes to be provided State make and cat No. ……....…….	No.	36		
24.22	Type-A High quality heavy duty red LED blinking flash illumination beacon aircraft warning light with polycarbonate lenses and bases per highmast. The luminaire to be complete with all accessories.State Make ……	No.	4		
24.23	1.5mm2 twin with earth PVC insulated copper cable from the cutout unit to the lighting fittings.	m	4,743		
24.24	Metal control pillar as per sl 4 (2), with lockable facility for three phase incomer service line and mounting plate for the electrical switch gear. The metal control pillar to have a corrosion and rust proof finishing to Engineer's approval. A concrete jacket to be installed as per the specification.	No.	4		
24.25	4 way surface mounted distribution boards with a 100 Amps DP intrgral isolator. State Make …….	No.	4		
24.26	(a) 20Amp 3 phase MCB's for item No. 6 above State Make ……	No.	68		
24.27	Blanking plates for item No. 6 above State Make ……	No.	68		
24.28	40Amps TPN current operated earth leakages circuit breaker withrated leakage current of 0.5A. State Make …….	No.	4		
24.29	40Amp TPN contactor. State Make …….	No.	4		
24.30	Photo cell kit, Photo cell socket and bracket. State Make ……..	No.	4		
24.31	4.6m steel column for mounting item No. 14 above	No.	4		
24.32	(a) 10.0mm2 4 core PVC/SWA/PVC Cu cable	m	10		

24.33	Earthing comprising of a 6mm2 earth lead and 1800mm long by 15mm diameter copper earth electrode with a driving tip andclamp in a 300mm by 300mm by 300mm concrete manhole with removable cover	No.	4		
24.34	1.5mm2 3 core PVC/SWA/PVC copper cable for terminating Photo cell.	m	10		
24.35	63Amp TPN MCB with enclosure type Crabtree or equivalent .State Make ...	No.	4		
	TOTAL CARRIED FOORWARD				-
Item	DESCRIPTION	UNIT	QTY	RATE	TOTAL
No.				KSHS.	KSHS
	Total brought forward from previous page				-
C)	Others				
24.36	Allow for provisional sum of Kenya shillings Tone million (Kshs.1,000,000/=) for allowances for Engineer's staff.	PC Sum	1		1,000,000.00
24.37	Extra over item 24.36 for profit and overhead	PC Sum			
24.38	Allow for provisional sum of Kenya shillings eight million (Kshs.8,000,000.00) for transport facilitation of supervision of the electrical works.	PC Sum	1		8,000,000.00
24.39	Extra over item 24.38 for profit and overhead	PC Sum			-
24.40	Allow for provisional sum of Kenya shillings One Hundred and fifty Thousand (Kshs. 150,000/=) for procurement of a Computer and a printer for project Administration.	PC Sum	1		150,000.00
24.41	Extra over item 24.40 for profit and overhead	PC Sum			
24.42	Allow for provisional sum of Kenya shillings One Hundred Thousand (Kshs.100,000/=) for procurement of requisite electrical testing tools	PC Sum	1		100,000.00

24.43	Allow for attendance to item 24.42	PC Sum			
24.44	Allow for payment to Kenya Civil Aviation Authority(KCAA) for approval of mast installation and facilitation of inspection of site by KCAA officers.	PC SUM	1		200,000.00
24.45	Attendance to item 24.44	PC Sum			
25.46	Monitoring and testing of water quality on natural water courses	PC Sum	1		2,000,000.00
25.47	Extra over item 25.46 for profit and overhead	%			
25.48	Monitoring and testing of soil quality for heavy metals and oil & grease at the start and end of construction activity at the relevant sites	PC Sum	1		20,000,000.00
25.49	Extra over item 25.48 for profit and overhead	%			
25.50	Digging, desilting and cleaning of rivers/channels on either side of the road	PC Sum	1		5,000,000.00
25.51	Extra over item 25.50 for profit and overhead	%			
24.52	Allow for prime cost sum sum for Maintence during Defects liability period.	PC Sum	1		10,000,000.00
25.53	Extra over item 25.52 for profit and overhead	%			
	Total of Bill № 24 carried forward to summary				46,450,000.00

	BILL № 25: ENVIRONMENTAL MITIGATION MEASURES				
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
25.01	Environmental and Social Impact Management Plan (ESMP)- Details in the ESMP	PC Sum	1		-
25.02	Extra over item 25.01 for profit and overhead	%			-
25.03	Environmental Social Management and Monitoring Plan (ESMMP)-Details in the ESMMP	PC Sum	1		-
25.04	Extra over item 25.03 for profit and overhead	%			-
25.05	Monitoring and testing of Air quality and Noise Levels as per NEMA requirements	PC Sum	1		-
25.06	Extra over item 25.05 for profit and overhead	%			-
25.07	Monitoring and testing of water quality on natural water courses	PC Sum	1		-
25.08	Extra over item 25.07 for profit and overhead	%			-
25.09	Monitoring and testing of soil quality for heavy metals and oil & grease at the start and end of construction activity at the relevant sites	PC Sum	1		-
25.10	Extra over item 25.09 for profit and overhead	%			-
25.11	Digging, desilting and cleaning of rivers/channels on either side of the road	PC Sum	1		-
25.12	Extra over item 25.11 for profit and overhead	%			-
Total of Bill № 25 carried forward to summary					
-					

ITEM	BILL № 26: HIV/AIDS AWARENESS				
	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
26.01	Implement HIV/AIDS awareness campaign amongst the workers for the duration of the contract	Mths	34		-
26.02	Allow for the availablity of condoms to workers, staff and surrounding community for the duration of contract	Mths	34		-
26.03	Allow for the participation of representative of local health authorities and National AIDS council to train and communicate with workers. Allowence to include transport, meals,accomodation and any other resonable allowances associated expenses and equipment expenses	Mths	34		-
26.04	Allow for the engagement of specialist HIV/COVID 19 sub contractor to deal with prevention and awareness activities as per programme to be approved by the Engineer	PC Sum	1		-
26.05	Extra over item 26.04 for overhead and profit	%	15%		-
26.06	Allow for the preparation and submission of monthly report for HIV/AIDS awareness and prevention activities report to be tabled at site meetings	Mths	34		-
26.07	Provide and erect HIV awareness bill boards greater than 5sqm on locations to be directed by the Engineer.	No.	3		-
Total of Bill № 26 carried forward to summary					-

BILL № 27: ROAD SAFETY AWARENESS CAMPAIGN					
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE (Kshs)	TOTAL (Kshs)
27.01	Allow for Instituting a Road Safety Awareness Campaign	PC Sum	1		-
27.02	Extra over item 27.01 for Contractor's profit and overheads	%			-
27.03	Allow for Instituting an Accident Prevention Campaign	PC Sum	1		-
27.04	Extra over item 27.03 for Contractor's profit and overheads	%			-
27.05	Allow for a Prime Cost Sum of Kshs 2,000,000.00 for Road Safety Training	PC Sum	1		2,000,000.00
27.06	Extra over item 27.05 for Contractor's profit and overheads	%			-
Total of Bill № 27 carried forward to summary					