NYAHURURU WATER &
SANITATION COMPANY

WATER SECTOR TRUST FUND

TENDER NAME:

UPGRADING AND REHABILITATION OF WATER PIPE NETWORK IN NYAHURURU MUNICIPALITY AT;

a) LUMUMBA,SITE PHASE I, KIANO AND UPPER CORESITE
b) LOWER CORESITE
c) GARDEN ESTATE

TENDER REF NO:

NYAHUWASCO/CLSG 2/OT/015/2024-2025

MANAGING DIRECTOR,

NYAHURURU WATER & SANITATION

COMPANY LIMITED

P.O.BOX 952-20300

NYAHURURU.

Website: www.nyahuwasco.co.ke

Tel Numbers: 0652032753/0728348312

Email: info@nyahuwasco.co.ke

CLOSING DATE: 23RD JUNE 2025, AT 12.00P.M, EAST AFRICAN TIME

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INVITATION TO TENDER **DATE: 10TH JUNE, 2025**

PROCURING ENTITY: NYAHURURU WATER AND SANITATION COMPANY LIMITED

TENDER NAME: UPGRADING AND REHABILITATION OF WATER PIPE NETWORK IN NYAHURURU MUNICIPALITY AT;

a) LUMUMBA, SITE PHASE I, KIANO AND UPPER CORESITE
b) LOWER CORESITE
c) GARDEN ESTATE

TENDER REF NO: NYAHUWASCO/CLSG2/OT/015/2024-2025

1. Nyahurururu Water and Sanitation Company limited invite sealed tenders for the **Upgrading and Rehabilitation of Water Pipe Network in Nyahururu Municipality at; a)Lumumba, Site Phase1, Kiano and Upper Coresite, b) Lower Coresite, c) Garden Estate**
2. Tendering will be conducted under open competitive method (National Tender) using a standardized tender document. Tendering is open to all qualified and interested Tenderers.
3. Qualified and interested tenderers may obtain further information and inspect the Tender Documents during office hours from **8:00a.m to 5:00p.m** at the address given below.
4. Tender documents may be obtained electronically from the Company's website **www.nyahuwasco.co.ke** or the Public Procurement Information Portal (PPIP) **tenders.go.ke** Tender documents obtained electronically will be free of charge.
5. Tender documents may be viewed and downloaded for free from the website www.nyahuwasco.co.ke. Or PPIP portal **tenders.go.ke** Tenderers who download the tender document must forward their particulars immediately to this email, **info@nyahuwasco.co.ke, Tel-0652032753, 0728348312** on week days to facilitate any further clarification or addendum.
6. Tenders shall be quoted in Kenya Shillings and shall include all taxes. Tenders shall remain valid for **154 days** from the date of opening of tenders.
7. All Tenders must be accompanied by a tender security of **Ksh.720, 000.00** from a reputable financial institution approved by PPRA to remain in force for period of (154) days from the closing date of the tender.
8. Completed tenders documents in a plain sealed envelope bearing no indication of the tenderer but clearly marked with the "**Tender Reference No. NYAHUWASCO/CLSG2/OT/015/2024-2025** for **Upgrading and Rehabilitation of Water Pipe Network in Nyahururu Municipality at ; a)Lumumba, Site Phase1, Kiano and Upper Coresite, b) Lower Coresite, c) Garden Estate and** must be delivered to the address below on or before **Monday, 23rd June, 2025 at 12:00p.m**. Electronic Tenders will not be permitted.
9. There will be a mandatory site visit on **16th June, 2025** starting at **9.00 a.m**.
10. The tenderer must prepare one original document and clearly mark it "**ORIGINAL**" and **two** additional **copies** of the tender document and clearly mark it "**COPY"** and submit them to the address below.

11. The tenderer must chronologically serialize all pages of the tender documents submitted.
12. Tenders will be opened immediately thereafter at the Company's Boardroom in the presence of the interested tenderers or their representatives who chose to attend. Tenders will be publicly opened in the presence of the Tenderers' designated representatives who choose to attend at the address below.
13. Late tenders will not be accepted. The addresses referred to above are:

A. Address for obtaining further information and for purchasing tender documents

Nyahururu Water and Sanitation Company Limited
Located near Nyahururu Law Courts next to Agricultural Finance Corporation (AFC)
P.O.BOX 952-20300, Nyahururu.
Contact Person: Managing Director, info@nyahuwasco.co.ke

B. Address for Submission of Tenders.

Managing Director,
Nyahururu Water and Sanitation Company Limited,
P.O.BOX 952-20300, Nyahururu.
The offices are located near Nyahururu Law Courts next to Agricultural Finance Corporation (AFC)
The Tender Box is placed at the Head office main entrance of the reception area

C. Address for Opening of Tenders.

At the **main office** of Nyahururu Water and Sanitation Company Limited Company's boardroom

PART 1 - TENDERING PROCEDURES

SECTION I: INSTRUCTIONS TO TENDERERS

A General Provisions

1. Scope of Tender

1.1 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 Tender Data Sheers (TDS).

2. Fraud and Corruption

2.1 The Procuring Entity requires compliance with the provisions of the Public Procurement and Asset Disposal Act, 2015, Section 62 "Declaration not to engage in corruption". The tender submitted by a person shall include a declaration that the person shall not engage in any corrupt or fraudulent practice and a declaration that the person or his or her sub-contractors are not debarred from participating in public procurement proceedings.

2.2 The Procuring Entity requires compliance with the provisions of the Competition Act 2010, regarding collusive practices in contracting. Any tenderer found to have engaged in collusive conduct shall be disqualified and criminal and/or civil sanctions may be imposed. To this effect, Tenders shall be required to complete and sign the "Certificate of Independent Tender Determination" annexed to the Form of Tender.

2.3 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.

2.4 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 being tendered for. The Procuring Entity shall indicate in the **TDS** firms (if any) that provided consulting services for the contract being tendered for. The Procuring Entity shall check whether the owners or controllers of the Tenderer are same as those that provided consulting services. The Procuring Entity shall, upon request, make available to any tenderer information that would give such firm unfair competitive advantage over competing firms.

3. Eligible Tenderers

3.1 A Tenderer may be a firm that is a private entity, a state-owned enterprise or institution subject to ITT 3.7 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. Public employees and their close relatives *(spouses, children, brothers, sisters and uncles and aunts)* are not eligible to participate in the tender. 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. The maximum number of JV members shall be specified in the **TDS.**

3.2 Public Officers of the Procuring Entity, their Spouses, Child, Parent, Brothers or Sister. Child, Parent, Brother or Sister of a Spouse, their business associates or agents and firms/organizations in which they have a substantial or controlling interest shall not be eligible to tender or be awarded a contract. Public Officers are also not allowed to participate in any procurement proceedings.

3.3 A Tenderer shall not have a conflict of interest. Any tenderer found to have a conflict of interest shall be disqualified. A tenderer may be considered to have a conflict of interest for the purpose of this tendering process, if the tenderer:

a) Directly or indirectly controls, is controlled by or is under common control with another tenderer; or

b) Receives or has received any direct or indirect subsidy from another tenderer; or

c) Has the same legal representative as another tenderer; or

d) Has a relationship with another tenderer, directly or through common third parties, that puts it in a position to influence the tender of another tenderer, or influence the decisions of the Procuring Entity regarding this

tendering process; or

e) Any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the 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 Engineer for the Contract implementation; or

g) Would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the contract specified in this Tender Document or

h) Has a close business or family relationship with a professional staff of the Procuring Entity who:

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) would be involved in the implementation or supervision of such Contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Procuring Entity throughout the tendering process and execution of the Contract.

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

3.5 A Tenderer (either individually or as a JV member) shall not participate in more than one Tender, except for permitted alternative tenders. This includes participation as a subcontractor in other Tenders. Such participation shall result in the disqualification of all Tenders in which the firm is involved. A firm that is not a tenderer or a JV member may participate as a subcontractor in more than one tender. 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.

3.6 A Tenderer may have the nationality of any country, subject to the restrictions pursuant to ITT 4.8.A Tenderer shall be deemed to have the nationality of a country if the Tenderer is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or sub-consultants for any part of the Contract including related Services.

3.7 Tenderer that has been debarred from participating in public procurement shall be ineligible to tender or be awarded a contract. The list of debarred firms and individuals is available from the website of PPRA www.ppra.go.ke.

3.8 Tenderers that are state-owned enterprises or institutions may be eligible to compete and be awarded a Contract(s) only if they are accredited by PPRA to be (I) a legal public entity of the state Government and/or public administration, (ii) financially autonomous and not receiving any significant subsidies or budget support from any public entity or Government, and (iii) operating under commercial law and vested with legal rights and liabilities similar to any commercial enterprise to enable it compete with firms in the private sector on an equal basis.

3.9 A Firms and individuals may be ineligible if their countries of origin (a) as a matter of law or official regulations, Kenya prohibits commercial relations with that country, or (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, Kenya prohibits any import of goods or contracting of works or services from that country, or any payments to any country, person, or entity in that country. A tenderer shall provide such documentary evidence of eligibility satisfactory to the Procuring Entity, as the Procuring Entity shall reasonably request.

3.10 Foreign tenderers are required to source at least forty (40%) percent of their contract inputs (in supplies, subcontracts and labor) from national suppliers and contractors. To this end, a foreign tenderer shall provide in its tender documentary evidence that this requirement is met. Foreign tenderers not meeting this criterion will be automatically disqualified. Information required to enable the Procuring Entity determine if this condition is met shall be provided in for this purpose is be provided in *"SECTION III - EVALUATION AND QUALIFICATION CRITERIA, Item 9"*.

3.11 Pursuant to the eligibility requirements of ITT 4.10, a tender is considered a foreign tenderer, if the tenderer is not registered in Kenya or if the tenderer is registered in Kenya and has less than 51 percent ownership by Kenyan Citizens. JVs are considered as foreign tenderers if the individual member firms are not registered in Kenya or if

are registered in Kenya and have less than 51 percent ownership by Kenyan citizens. The JV shall not subcontract to foreign firms more than 10 percent of the contract price, excluding provisional sums.

3.12 The National Construction Authority Act of Kenya requires that all local and foreign contractors be registered with the National Construction Authority and be issued with a Registration Certificate before they can undertake any construction works in Kenya. Registration shall not be a condition for tender, but it shall be a condition of contract award and signature. A selected tenderer shall be given opportunity to register before such award and signature of contract. Application for registration with National Construction Authority may be accessed from the website www.nca.go.ke.

3.13 The Competition Act of Kenya requires that firms wishing to tender as Joint Venture undertakings which may prevent, distort or lessen competition in provision of services are prohibited unless they are exempt in accordance with the provisions of Section 25 of the Competition Act, 2010. JVs will be required to seek for exemption from the Competition Authority. Exemption shall not be a condition for tender, but it shall be a condition of contract award and signature. A JV tenderer shall be given opportunity to seek such exemption as a condition of award and signature of contract. Application for exemption from the Competition Authority of Kenya may be accessed from the website www.cak.go.ke

3.14 A Kenyan tenderer shall provide evidence of having fulfilled his/her tax obligations by producing a valid tax clearance certificate or tax exemption certificate issued by the Kenya Revenue Authority.

4. Eligible Goods, Equipment, and Services

4.1 Goods, equipment and services to be supplied under the Contract may have their origin in any country that is not eligible under ITT 3.9. At the Procuring Entity's request, Tenderers may be required to provide evidence of the origin of Goods, equipment and services.

4.2 Any goods, works and production processes with characteristics that have been declared by the relevant national environmental protection agency or by other competent authority as harmful to human beings and to the environment shall not be eligible for procurement.

5. Tenderer's Responsibilities

5.1 The tenderer shall bear all costs associated with the preparation and submission of his/her tender, and the Procuring Entity will in no case be responsible or liable for those costs.

5.2 The tenderer, at the tenderer's own responsibility and risk, is encouraged to visit and examine 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.

5.3 The Tenderer and any of its personnel or agents will be granted permission by the Procuring Entity to enter upon 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 inspection.

5.4 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

6. Sections of Tender Document

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

PART 1 Tendering Procedures

i) Section I - Instructions to Tenderers (ITT)
ii) Section II - Tender Data Sheet (TDS)
iii) Section III - Evaluation and Qualification Criteria
iv) Section IV - Tendering Forms

PART 2 Works Requirements

i) Section V - Drawings
ii) Section VI - Specifications
iii) Section VII - Bills of Quantities

PART 3 Conditions of Contract and Contract Forms

i) Section VIII - General Conditions of Contract (GCC)
ii) Section IX - Special Conditions of Contract (SC)
iii) Section X - Contract Forms

6.2 The Invitation to Tender Document (ITT) issued by the Procuring Entity is not part of the Contract documents.

6.3 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 the pre-Tender meeting (if any), or Addenda to the Tender document in accordance with ITT 8. In case of any contradiction, documents obtained directly from the Procuring Entity shall prevail.

The Tenderer is expected to examine all instructions, forms, terms, and specifications in the Tender Document and to furnish with its Tender all information and documentation as is required by the Tender document.

7. Site Visit

7.1 The Tenderer, at the Tenderer's own responsibility and risk, is encouraged to visit and examine and inspect the Site of the Required Services and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for the Services. The costs of visiting the Site shall be at the Tenderer's own expense.

8. Pre-Tender Meeting

8.1 The Procuring Entity shall specify in the **TDS** if a pre-tender meeting will be held, when and where. The Procuring Entity shall also specify in the **TDS** if a pre-arranged pretender site visit will be held and when. The Tenderer's designated representative is invited to attend a pre-arranged pretender visit of the site of the works. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

8.2 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.

8.3 Minutes of the pre-Tender meeting and the pre-arranged pretender site visit of the site of the works, 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 in accordance with ITT 6.3. Minutes shall not identify the source of the questions asked.

8.4 The Procuring Entity shall also promptly publish anonym zed (*no names*) Minutes of the pre-Tender meeting and the pre-arranged pretender visit of the site of the works at the web page identified in the **TDS**. Any modification to the Tender Documents that may become necessary as a result of the pre-tender meeting and the pre-arranged pretender site visit, 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. **Nonattendance at the pre-Tender meeting will not be a cause for disqualification of a Tenderer.**

9. Clarification and amendments of Tender Documents

9.1 A Tenderer requiring any clarification of the Tender Document shall contact the Procuring Entity in writing at the

Procuring Entity's address specified in the **TDS** or raise its enquiries during the pre-Tender meeting and the pre-arranged pretender visit of the site of the works if provided for in accordance with ITT 8.4. The Procuring Entity will respond in writing to any request for clarification, provided that such request is received no later than the period specified in the **TDS** prior to the deadline for submission of tenders.

The Procuring Entity shall forward copies of its response to all tenderers who have acquired the Tender Documents in accordance with ITT 6.3, including a description of the inquiry but without identifying its source. If 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 appropriately following the procedure under ITT 8.4.

10. Amendment of Tendering Document

10.1 At any time prior to the deadline for submission of Tenders, the Procuring Entity may amend the Tendering document by issuing addenda.

10.2 Any addendum issued shall be part of the tendering document and shall be communicated in writing to all who have obtained the tendering document from the Procuring Entity in accordance with ITT 6.3. The Procuring Entity shall also promptly publish the addendum on the Procuring Entity's web page in accordance with ITT 8.4.

10.3 To give prospective Tenderers reasonable time in which to take an addendum into account in preparing their Tenders, the Procuring Entity shall extend, as necessary, the deadline for submission of Tenders, in accordance with ITT 25.2 below**.**

C. Preparation of Tenders

11. Cost of Tendering

11.1 The Tenderer shall bear 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.

12. Language of Tender

12.1 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.

13. Documents Comprising the Tender

13.1 The Tender shall comprise the following:

a) Form of Tender prepared in accordance with ITT 14;
b) Schedules including priced Bill of Quantities, completed in accordance with ITT 14 and ITT 16;
c) Tender Security or Tender-Securing Declaration, in accordance with ITT 21.1;
d) Alternative Tender, if permissible, in accordance with ITT 15;
e) Authorization: written confirmation authorizing the signatory of the Tender to commit the Tenderer, in accordance with ITT 22.3;
f) Qualifications: documentary evidence in accordance with ITT 19establishing the Tenderer's qualifications to perform the Contract if its Tender is accepted;
g) Conformity: a technical proposal in accordance with ITT 18;
h) Any other document required in the **TDS**.

13.2 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 Agreement. The Tenderer shall chronologically serialize pages of all tender documents submitted.

13.3 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**.**

14. Form of Tender and Schedules

14.1 The Form of Tender and Schedules, including the Bill of Quantities*,* shall be prepared using the relevant form*s* 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.

15. Alternative Tenders

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

15.2 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.

15.3 Except as provided under ITT 13.4 below, Tenderers wishing to offer technical alternatives to the requirements of the Tender Documents must first price the Procuring Entity's design as described in the Tender Documents and shall further provide all information necessary for a complete evaluation of the alternative by the Procuring Entity, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the Tenderer with the Winning Tender conforming to the basic technical requirements shall be considered by the Procuring Entity. 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.

16. Tender Prices and Discounts

16.1 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.

16.2 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.

16.3 The price to be quoted in the Form of Tender, in accordance with ITT 14.1, shall be the total price of the Tender, including any discounts offered.

16.4 The Tenderer shall quote any discounts and the methodology for their application in the Form of Tender, in accordance with ITT 14.1.

16.5 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.

16.6 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 16.4, provided the Tenders for all lots (contracts) are opened at the same time.

16.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 30 days prior to the deadline for submission of Tenders, shall be included in the rates and prices and the total Tender Price submitted by the Tenderer.

17. Currencies of Tender and Payment

17.1 Tenderers shall quote entirely in Kenya Shillings. The unit rates and the prices shall be quoted by the Tenderer in the Bill of Quantities, entirely in Kenya shillings. A Tenderer expecting to incur expenditures in other currencies for inputs to the Works supplied from outside Kenya shall device own ways of getting foreign currency to meet those expenditures.

18. Documents Comprising the Technical Proposal

18.1 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, in sufficient detail to demonstrate the adequacy of the Tenderer's proposal to meet the work's requirements and the completion time.

19. Documents Establishing the Eligibility and Qualifications of the Tenderer

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

19.2 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.

19.3 A margin of preference will not be allowed. Preference and reservations will be allowed, individually or in joint ventures. Applying for eligibility for Preference and reservations shall supply all information required to satisfy the criteria for eligibility specified in accordance with ITT 33.1.

19.4 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 contractor or group of contractors qualifies for a margin of preference. Further the information will enable the Procuring Entity identify any actual or potential conflict of interest in relation to the procurement and/or contract management processes, or a possibility of collusion between tenderers, and thereby help to prevent any corrupt influence in relation to the procurement process or contract management.

19.5 The purpose of the information described in ITT 19.4 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.

19.6 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 6.3. 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.

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

19.8 If a tenderer fails to submit the information required by these requirements, its tender 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.

19.9 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 ongoing, 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.

19.10 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 6.7 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 tenderer.

20. Period of Validity of Tenders

20.1 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 24). A Tender valid for a shorter period shall be rejected by the Procuring Entity as non-responsive.

20.2 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 21.1, 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 the request shall not be required or permitted to modify its Tender, except as provided in ITT 20.3.

20.3 If the award is delayed by a period exceeding the number of days to be specified in the **TDS** days beyond the expiry of the initial tender validity period, the Contract price shall be determined as follows**:**

a) in the case of **fixed price** contracts, the Contract price shall be the tender price adjusted by the factor specified in the **TDS**;

b) in the case of **adjustable price** contracts, no adjustment shall be made; or in any case, tender evaluation shall be based on the tender price without taking into consideration the applicable correction from those indicated above.

21. Tender Security

21.1 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**.**

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

a) an unconditional Bank Guarantee issued by reputable commercial bank); or

b) an irrevocable letter of credit;

c) a Banker's cheques issued by a reputable commercial bank; or

d) another security specified **in the TDS**,

21.3 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 20.2.

21.4 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.

21.5 If a Tender Security is specified pursuant to ITT 21.1, 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 nonresponsive or a bidder declines to extend tender validity period.

21.6 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**.

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

e) if a Tenderer withdraws its Tender during the period of Tender validity specified by the Tenderer on the Form of Tender, or any extension thereto provided by the Tenderer; or

f) if the successful Tenderer fails to:

i) sign the Contract in accordance with ITT 50; or

ii) furnish a Performance Security and if required in the **TDS**, and any other documents required in the **TDS**.

21.8 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.

21.9 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.

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

22. Format and Signing of Tender

22.1 The Tenderer shall prepare one original of the documents comprising the Tender as described in ITT 13 and clearly mark it "ORIGINAL." Alternative Tenders, if permitted in accordance with ITT 15, shall be clearly marked "ALTERNATIVE." In addition, the Tenderer shall submit copies of the Tender, in the number specified in the **TDS** and clearly mark them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

22.2 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.

22.3 The original and all copies of the Tender shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Tenderer. This authorization shall consist of a written confirmation as specified in the **TDS** and shall be attached to the Tender. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Tender where entries or amendments have been made shall be signed or initialed by the person signing the Tender.

22.4 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 to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.

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

D. Submission and Opening of Tenders

23. Sealing and Marking of Tenders

23.1 Depending on the sizes or quantities or weight of the tender documents, a tenderer may use an envelope, package or container. The Tenderer shall deliver the Tender in a single sealed envelope, or in a single sealed package, or in a

single sealed container bearing the name and Reference number of the Tender, addressed to the Procuring Entity and a warning not to open before the time and date for Tender opening date. Within the single envelope, package or container, the Tenderer shall place the following separate, sealed envelopes:

a) in an envelope or package or container marked "ORIGINAL", all documents comprising the Tender, as described in ITT 11; and
b) in an envelope or package or container marked "COPIES", all required copies of the Tender; and
c) if alternative Tenders are permitted in accordance with ITT 15, 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.

23.2 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 are misplaced or opened prematurely will not be accepted.

24. Deadline for Submission of Tenders

24.1 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**.

24.2 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.

25. Late Tenders

25.1 The Procuring Entity shall not consider any Tender that arrives after the deadline for submission of tenders, in accordance with ITT 24. 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.

26. Withdrawal, Substitution, and Modification of Tenders

26.1 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 22.3, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Tender must accompany the respective written notice. All notices must be:

a) prepared and submitted in accordance with ITT 22 and ITT 23 (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 24.

26.2 Tenders requested to be withdrawn in accordance with ITT 26.1 shall be returned unopened to the Tenderers.

26.3 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.

27. Tender Opening

27.1 Except in the cases specified in ITT 23 and ITT 26.2, 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 who chooses to attend. Any specific electronic Tender opening procedures required if electronic Tendering is permitted in accordance with ITT 24.1, shall be as specified in the **TDS**.

27.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelopes with the corresponding Tender shall not be opened, but returned to the Tenderer. No Tender withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at Tender opening.

27.3 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.

27.4 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.

27.5 Next, all remaining envelopes shall be opened one at a 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.

27.6 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 Bills of Quantities are to be initialed by the members of the tender opening committee attending the opening. The number of representatives of the Procuring Entity to sign shall be specified in the **TDS**.

27.7 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 25.1).

27.8 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.

27.9 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 the tender opening register shall be distributed to all Tenderers upon request.

E. Evaluation and Comparison of Tenders

28. Confidentiality

28.1 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 46.

28.2 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.

28.3 Notwithstanding ITT 28.2, 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.**

29. Clarification of Tenders

29.1 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 33.

29.2 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.

30. Deviations, Reservations, and Omissions

30.1 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.

31. Determination of Responsiveness

31.1 The Procuring Entity's determination of a Tender's responsiveness is to be based on the contents of the tender itself, as defined in ITT 13.

31.2 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.

31.3 The Procuring Entity shall examine the technical aspects of the tender submitted in accordance with ITT 18, to confirm that all requirements of Section VII, Works' Requirements have been met without any material deviation, reservation or omission.

31.4 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.

32. Non-material Non-conformities

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

32.2 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, to rectify nonmaterial non-conformities in the tender related to documentation requirements. Requesting information or documentation on such non-conformities shall not be related to any aspect of the price of the tender. Failure of the tenderer to comply with the request may result in the rejection of its tender.

32.3 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.**

33. Arithmetical Errors

33.1 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 any way by any person or entity.

33.2 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, and subtotal 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

33.3 **Tenderers shall be notified of any error detected in their bid during the notification of a ward**.

34. Currency provisions

34.1 Tenders will priced be in Kenya Shillings only. Tenderers quoting in currencies other than in Kenya shillings will be determined non-responsive and rejected.

35. Margin of Preference and Reservations

35.1 No margin of preference shall be allowed on contracts for small works.

35.2 Where it is intended to reserve the contract to specific groups under Small and Medium Enterprises, or enterprise of women, youth and/or persons living with disability, 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/firms belonging to those specified groups are the only ones eligible to tender. Otherwise if no so stated, the invitation will be open to all tenderers.

36. Nominated Subcontractors

36.1 Unless otherwise stated in the **TDS**, the Procuring Entity does not intend to execute any specific elements of the Works by subcontractors selected in advance by the Procuring Entity.

36.2 Tenderers may propose subcontracting up to 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.

36.3 The 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 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.

37. Evaluation of Tenders

37.1 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 Best Evaluated Tender in accordance with ITT 40.

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

a) price adjustment due to discounts offered in accordance with ITT16;

b) converting the amount resulting from applying (a) and (b) above, if relevant, to a single currency in accordance with ITT39;

c) price adjustment due to quantifiable nonmaterial non-conformities in accordance with ITT 30.3; and

d) any additional evaluation factors specified **in the TDS** and Section III, Evaluation and Qualification Criteria.

37.3 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 in Tender evaluation.

37.4 In the case of multiple contracts or lots, Tenderers shall be allowed to tender for one or more lots and the

methodology to determine the lowest evaluated cost of the lot (contract) combinations, including any discounts offered in the **Form of Tender, is specified in Section III, Evaluation and Qualification Criteria.**

38. Comparison of Tenders

38.1 The Procuring Entity shall compare the evaluated costs of all substantially responsive Tenders established in accordance with ITT 38.2 to determine the Tender that has the lowest evaluated cost.

39. Abnormally Low Tenders

39.1 An Abnormally Low Tender is one where the Tender price, in combination with other elements of the Tender, appears so low that it raises material concerns as to the capability of the Tenderer in regards to the Tenderer's ability to perform the Contract for the offered Tender Price or that genuine competition between Tenderers is compromised.

39.2 In the event of identification of a potentially Abnormally Low Tender, the Procuring Entity shall seek written clarifications from the Tenderer, including detailed price analyses of its Tender price in relation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the Tender document.

39.3 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.

40. Abnormally High Tenders

40.1 An abnormally high 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.

40.2 In case of an abnormally high tender 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.

40.3 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**.**

41. Unbalanced and/or Front-Loaded Tenders

41.1 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.

41.2 After the evaluation of the information and detailed price analyses presented by the Tenderer, the Procuring Entity may as appropriate:

a) accept the Tender; or

b) require that the total amount of the Performance Security be increased at the expense of the Tenderer to a level not exceeding a 30% 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,

42. Qualifications of the Tenderer

42.1 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.

42.2 The determination shall be based upon an examination of the documentary evidence of the Tenderer's qualifications submitted by the Tenderer, pursuant to ITT 19. The determination shall not take into consideration the qualifications of other firms such as the Tenderer's subsidiaries, parent entities, affiliates, subcontractors (other than Specialized Subcontractors if permitted in the Tender document), or any other firm(s) different from the Tenderer.

42.3 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.

42.4 An Abnormally Low Tender is one where the Tender price, in combination with other elements of the Tender, appears so low that it raises material concerns as to the capability of the Tenderer in regards to the Tenderer's ability to perform the Contract for the offered Tender Price.

42.5 In the event of identification of a potentially Abnormally Low Tender, the Procuring Entity shall seek written clarifications from the Tenderer, including detailed price analyses of its Tender price in relation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the Tender document.

42.6 After evaluation of the price analyses, if 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.

43. Best Evaluated Tender

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

a) Most responsive to the Tender document; and

b) the lowest evaluated price.

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

44.1 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 thereby incurring any liability to Tenderers. In case of annulment, all Tenderers shall be notified with reasons and all Tenders submitted and specifically, Tender securities, shall be promptly returned to the Tenderers.

F. Award of Contract

45. Award Criteria

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

46. Notice of Intention to enter into a Contract

46.1 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 standstill period;

47. Standstill Period

47.1 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.

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

48. Debriefing by the Procuring Entity

48.1 On receipt of the Procuring Entity's Notification of Intention to Enter into a Contract referred to in ITT 46, an unsuccessful tenderer may make a written request to the Procuring Entity for a debriefing on specific issues or concerns regarding their tender. The Procuring Entity shall provide the debriefing within five days of receipt of the request.

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

49. Letter of Award

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

50. Signing of Contract

50.1 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.

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

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

51. Appointment of Adjudicator

51.1 The Procuring Entity proposes the person named in the **TDS** to be appointed as Adjudicator under the Contract, at the hourly fee specified in the **TDS**, plus reimbursable expenses. If the Tenderer disagrees with this proposal, the Tenderer should so state in his Tender. If, in the Letter of Acceptance, the Procuring Entity does not agree on the appointment of the Adjudicator, the Procuring Entity will request the Appointing Authority designated in the Special Conditions of Contract (SCC) pursuant to Clause 23.1 of the General Conditions of Contract (GCC), to appoint the Adjudicator.

52. Performance Security

52.1 Within twenty-one (21) days of the receipt of the Letter of Acceptance from the Procuring Entity, the successful Tenderer shall furnish the Performance Security and, any other documents required in the **TDS**, in accordance with the General Conditions of Contract, subject to ITT 40.2 (b), using the Performance Security and other

Forms included in Section X, Contract Forms, or another form acceptable to the Procuring Entity. A foreign institution providing a bank guarantee shall have a correspondent financial institution located in Kenya, unless the Procuring Entity has agreed in writing that a correspondent bank is not required.

52.2 Failure of the successful Tenderer to submit the above-mentioned Performance Security and other documents required in the **TDS**, or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Tender Security. In that event the Procuring Entity may award the Contract to the Tenderer offering the next Best Evaluated Tender.

52.3 Performance security shall not be required for contracts estimated to cost less than Kenya shillings five million shillings**.**

53. Publication of Procurement Contract

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

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

54. Procurement Related Complaints and Administrative Review

54.1 The procedures for making Procurement-related Complaints are as specified in the **TDS**.

54.2 A request for administrative review shall be made in the form provided under contract forms.

SECTION II - TENDER DATA SHEET (TDS)

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

ITT Reference	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS
	A. General
ITT 1.1	The name of the contract is: **Upgrading and Rehabilitation of Water Pipe Network in Nyahururu Municipality at; a)Lumumba ,Site Phase1, Kiano and Upper Coresite, b) Lower Coresite, c) Garden Estate** The reference number of the Contract is: **NYAHUWASCO/CLSG 2/OT/015/2024-2025**
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 :***) No Joint Venture Shall Be Allowed***
B. Contents of Tender Document	
ITT 8.1	(A) Pre-Tender conference ***shall*** *not* take place at the following date, time and place: Date: **N/A** Time: **N/A** Place: **N/A** (B) A pre-arranged pretender visit of the site of the works *shall* take place at the following date, time and place: Date: **16th June, 2025** Time: **9:00a.m.** Place: **Assemble at Nyahururu Head Office so as to proceed as a team to the various sites within Nyahururu town**. **NOTE** Every Bidder shall be represented by one Technical Person who SHALL bring an **ID copy**, **Original Introductory letter** bearing the **Company letterhead** and an **Official Stamp** authorizing them to represent them in the specific pre-tender site visit/Pre-Tender Conference. The letter shall be duly signed. Photocopies or any other media shall not be accepted
ITT 8.2	The Tenderer will submit any questions in writing, to reach the Procuring Entity not later than **13th June, 2025**
ITT 8.4	The Procuring Entity's website where Minutes of the pre-Tender meeting and the pre-arranged pretender site visit will be published is ***www.nyahuwasco.co.ke***
ITT 9.1	For Clarification of Tender purposes, for obtaining further information and for purchasing tender documents, the Procuring Entity's address is: ATTENTION: **Managing Director** **Nyahururu Water and Sanitation Company Limited** **P.O.BOX 952-20300, Nyahururu,** **info@nyahuwasco.co.ke** Located near Nyahururu Law Courts next to Agricultural Finance Corporation (AFC)
C. Preparation of Tenders	
ITP 13.1 (h)	The Tenderer shall submit the following additional documents in its Tender: **As detailed in the preliminary Evaluation and Technical Evaluation criteria**
ITT 15.1	Alternative Tenders ***shall not*** be considered

ITT Reference	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS
ITT 15.2	Alternative times for completion ***shall be*** permitted.
ITT 15.4	Alternative technical solutions **shall not be** permitted for the following parts of the Works:
ITT 16.5	The prices quoted by the Tenderer shall be: ***fixed***
ITT 20.1	The Tender validity period shall be ***154*** days.
ITT 20.3 (a)	**(a)** The delayed to exceeding ***30*** number of days. **(b)** The Tender price shall be adjusted by the following percentages of the tender price: (***i***) By _ ***None*** _% of t*he local currency portion of the Contract price adjusted to reflect local inflation during the period of extension,* *and* ***(ii)*** *By_* ***None*** *_% the foreign currency portion of the Contract price adjusted to reflect the international inflation during the period of extension.*
ITT 21.1	***A Tender Security shall be required.*** A Tender-Securing Declaration ***shall not*** be required. The amount and currency of the Tender Security shall be: **KSH. 720,000.00**
ITT 21.2 (d)	The other Tender Security shall be **NONE**
ITT 21.5	Other documents required are: NCA Registration certificate, Contractor`s all risk insurance policies (Works, Plant and Equipment), Third-party Insurance, WIBA or GPA and programme of works
ITT 22.1	In addition to the original of the Tender, the number of copies is : ***the tenderer shall provide one (1) original and two (2) copies***
ITT 22.3	The written confirmation of authorization to sign on behalf of the Tenderer shall consist of: _____ **i) Power of Attorney and should indicate;** • Name of the person authorized to sign on behalf of the tenderer • Designation of the person authorized • Signature and Date • Insert official stamp **ii) Confidential business questionnaire duly completed** detailing directors/partners/sole proprietorship, MUST disclose power of attorney of the signatory.
D. Submission and Opening of Tenders	
ITT 24.1	(A) For Tender submission purposes only, the Procuring Entity's address is: **Managing Director,** **Nyahururu Water and Sanitation Company Ltd** **P.O.BOX 952-20300**, **Nyahururu** Tender box placed at the head office main reception area located near Nyahururu Law Courts next to Agricultural Finance Corporation Date and time for submission of Tenders **Monday 23rd June, 2025 at 12:00p.m** Tenderers **shall not be submitting** tenders electronically.
ITT 27.1	The Tender opening shall take place at the time and the address for Opening of Tenders provided below: **Managing Director,** **Nyahururu Water and Sanitation Company Ltd** **P.O.BOX 952-20300, Nyahururu** Offices located near Nyahururu Law Courts next to Agricultural Finance Corporation **Tender Opening will be at the company's board room immediately after submission deadline on Monday, 23rd June, 2025 at 12:00p.m**

ITT Reference	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS
ITT 27.1	Tenderers shall not have the option of submitting their Tenders electronically.
ITT 27.6	The number of representatives of the Procuring Entity to sign is ***_All appointed members of the tender opening committee***
E. Evaluation, and Comparison of Tenders	
ITT 32.3	The adjustment shall be based on the ***average*** price of the item or component as quoted in other substantially responsive Tenders. If the price of the item or component cannot be derived from the price of other substantially responsive Tenders, the Procuring Entity shall use its best estimate.
ITT 33	An error shall be considered a major deviation that leads to disqualification of the tender if the percentage of the error (error over the tender price quoted) is: **more than 2.5%.**
ITT 34	The currency that shall be used for Tender evaluation and comparison purposes to convert at the selling exchange rate all Tender prices expressed in various currencies into a single currency is: **Kenya Shillings**
ITT 35.2	The invitation to tender is extended to the following groups that qualify for Reservations: **Not Reserved but Open to all eligible bidders**
ITT 36.1	At this time, the Procuring Entity ***does not intend*** to execute certain specific parts of the Works by subcontractors selected in advance.
ITT 36.2	Contractor's may propose subcontracting: Maximum percentage of subcontracting permitted is: **does not apply** of the total contract amount. Tenderers planning to subcontract more than **does not apply** 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 36.3	The parts of the Works for which the Procuring Entity permits Tenderers to propose Specialized Subcontractors are designated as follows: **does not apply** For the above-designated parts of the Works that may require Specialized Subcontractors, the relevant qualifications of the proposed Specialized Subcontractors will be added to the qualifications of the Tenderer for the purpose of evaluation.
ITT 37.2 (d)	Additional requirements apply. These are detailed in the **evaluation criteria in Section III**, Evaluation and Qualification Criteria.
ITT 51.1	The person named to be appointed as Adjudicator is ***Nairobi Centre for International Arbitration***
ITT 52.2	Other documents required are **All Tendering forms must be fully filled before submision**
ITT 54.1	The procedures for making a Procurement-related Complaints are detailed in the "Regulations" available from the PPRA Website www.ppra.go.ke or email 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: Title/position: **Managing Director** Procuring Entity: **Nyahururu Water and Sanitation Co. Ltd** Email address*:* **info@nyahuwasco.co.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

1. General Provisions

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.

2. Evaluation and contract award Criteria

NYAHUWASCO 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.

Stage1. Preliminary examination for Determination of Responsiveness
Tenders that do not pass the Preliminary Examination will be considered irresponsive and will not be considered further.

Mandatory Requirements (MR) Evaluation and comparison of Tenders:
The following evaluation criteria shall be applied not withstanding any other requirement in the tender documents.
LEGEND: Indicate with **Y/N** (Yes/No) if MR was submitted to full satisfaction of tender committee.
Indicate with **P/F** (Pass or Fail) in last row if the tender's submission is responsive or not.

NO	ITEM DESCRIPTION	SPECIFIC REQUIREMENTS
1	The Tender is signed and by the person with power of attorney, without material deviation, reservation, or omission.	
2	Must Submit a copy of certificate of Registration/ Incorporation	Copy with year of Registration/ Incorporation
3	Must attach a copy of a valid CR12 not older than 12 months	List of current directors of the firm and there shares indicated
4	Must Submit a copy of the firm's KRA PIN Certificate	KRA PIN Certificate
5	Must Submit a copy of Valid Tax Compliance certificate	Serial No: Expiry Date:
6	Must Fill the Bill of Quantities in the Format provided	Dully Filled & Signed
7	Must Fill the Form of Tender in the Format provided	Dully Filled & Signed
8	Must submit a Tender Security of **Ksh.720,000.00**	From (Bank, Insurance Providers approved by PPRA) Amount **Ksh.720,000.00**
9	Must submit a copy of valid certificate of registration with the National Construction Authority **(NCA – 6 and above for Water works)**	Indicate Registration Category
10	Must submit a copy of valid contractors annual practicing license with the National Construction Authority **(NCA – 6 and above for Water works)**	Indicate Registration Category
11	Must submit a copy of valid business permit from the respective county government	Valid Business Permit

11	Must submit a duly filled and signed up Confidential Business Questionnaire **in the format provided**	Duly Filled and Signed
12	The document must be initialed, stamped and paginated (chronologically serialized 1, 2, 3 …), hard bound and completely filled	Completely filled, paginated, initialed, stamped and hard bound document
13	The required number of copies **(Original and two (2) more copies)** of the tender document are submitted	One tender document should clearly be marked as **"Original"** and **two copies** each clearly marked as **Copy"**
15	Litigation history related to government contracts – Fill the litigation form and **must** be signed by the commissioner of oaths	Form signed by commissioner of oaths (authenticity of the above litigation history will be verified)
16	The tender does not have interlineations, erasures or overwriting no correction of errors should be made by the tenderer	Cleanly filled tender document
17	Tenderer has not been debarred by the PPRA or any other recognized institution.	Disclosure of debarment
18	Tenderer has no conflicts of interest, fill the form in the format provided	Disclosure of conflict of interest
19	Must clearly indicate the tender is **valid for 154 days**.	Attach written and approved document by the firm
TENDERER'S SUBMISSION STATUS (indicate P/F)		

NOTE:
All Bidders must meet all the above mandatory requirements to qualify.
Bidders who fail to meet any of the above shall be disqualified at this stage, hence not proceed to technical evaluation stage.

Stage 2- Technical Evaluation

The Technical Evaluation will be marked out of 100 and will determine the technical score (TS)
Bidders who shall attain less than 70% will not be subjected to financial evaluation

NO	EVALUATION ATTRIBUTE	EVIDENCE REQUIRED	WEIGHING SCORES	MAX SCORE
2.1	**FIRM'S GENERAL AND SPECIFIC EXPERIENCE**			
i	**General Experience** Evidence of undertaking **at least 3 civil works** of a cumulative value equivalent to **Ksh.30, 000, 000** or above with government or public institutions **within the last 5 years**.	Provide **3 relevant assignments** within the last **5 years** (Attach copies of contracts or completion certificates within the stated period)	**a)** 3Contracts each with value of Ksh. 30,000,000 and over -**20marks** **b)** 29, 999, 999-25 million- **5marks** **c)**24,999,999 -20 million-**10marks** **d)**19, 999, 999-15 million - **5marks** **e)**14, 999, 999-10 million - **3marks** **f)** 9, 999, 999- 5 million - **1marks** Below 5million- **0mark**	**20 marks**
ii	**Specific Experience** Provide evidence of experience in successful completion of similar works; Completing **at least 3 Similar Assignments** in Construction of Water Supply Pipelines of pipes between **DN 32mm to 160mm within** the last 5 years	Attach copies of completion certificates, or payment certificates within the last 5 years ***N/B. LPOs, LSOs & Copies of contract shall not be considered***	Each completed assignment-**5marks**	**15 marks**

2.2	**FINANCIAL CAPACITY**			
i	**Audited Accounts** Audited Financial statements for the last 3 years	Attach a copy of signed and stamped audited Financial statements for 2022,2023and 2024, clearly indicating the Auditing Firm and the Auditor's **ICPAK license Number**	Each audited financial statement at **3 marks**	**9 marks**
ii	**Cash Flow** Stamped and Signed Bank Statements for the **last 12 months**	Attach stamped and signed bank statement for the last 12 months	**Bank statement of net value of :** Ksh.50-30 Million - **10mark**s Ksh.29-20 Million - **5 marks** Ksh.19-10 Million - **3 marks** Ksh.9-5 Million - **1 marks** Less than Ksh.5 million-**0 marks**	**10 marks**
iii	**Financial Strength of the company based on**: Current Ratio= Current Assets/Current Liabilities	Attach audited Financial statements for the last 3 years	• 2:1 ratio- **3 marks** • Others prorated at: Ratio*3/2	**3 marks**
iv	Financial Stability of the company basing on **profit making in the last 3 years**	Attach audited Financial statements for the last 3 years	• Profit – **4 marks** • Loss – **0 marks**	**4 marks**
2.3	Proof of availability of **relevant Equipment and accessories owned** by the company and to be directly assigned to the project during the contract period	Attach **certified copies** of certificates of ownerships, purchase receipts, sale agreements or lease agreements **(NB: Photos and lists of equipment without the above documents will not be admitted)**	a) **HDPE Butt** fusion and generator- **2 marks** b) **Backhoe** - **2 marks** c) Transportation **truck** at least 10 tone - **2 marks** d) **Pickup** up truck/ - **2 marks** **e) Hiab truck – 1** f**)** Dewatering pumps 5.5hp and above**- 1 mark** g) **Concrete** Mixer and **Poker vibrator** (40mm-60mm)- **1 marks** h) **Set of survey** equipment (Automatic level, survey staff, ranging rods etc) **-1 marks** **i) pedestrian roller – 1 mark**	**13 marks**
2.4	Company Staffing Capacity- Provide detailed proposal of key technical members for the proposed project, copies and CV of the proposed team, Enclose detailed certificate	Attach CVs, copies of certificates, Professionals must attach copies of valid practicing licenses from the relevant professional bodies	a) **1 no. Site Engineer** Degree holder in Civil, water or related engineering with over 7 years' experience and registered by EBK as a professional engineer-**(7 marks)-1 mark** per year of experience b**) 1no. Site Foreman** Degree holder in Civil, water or related engineering with over 5 years' experience -**(5 marks)-1 mark** per year of experience) c) **1no. Surveyor** Minimum of a diploma in surveying with over 3 years' experience-**(3marks)** – **1 mark** per year of experience) d) **5 no. Pipe fitters** with over 5 years' experience and registered by NCA- **(2.5 Marks**)-**0.1mark** per pipe fitter per year of experience e) 2 no. **Masons**: with over 5 years' experience and registered by NCA **-(2.5**	**20 marks**

			marks)-0.25mark per mason per year of experience	
2.5	Company Profile	Provide neat company profile with clear organization structure with details of responsibilities	Properly and neatly done company profile	**3 marks**
2.6	Proposed Methodology/work plan	**i)** Attach a program of works and cash flow projections clearly indicating the time frame and activities from Start to the completion of the Project ii) Attach work methodology including; a) the quality management plan b) Environmental and Social c) Management Plan (ESMP) d) Health and safety management plan	1. Clear, neat and stamped program of works- **1 mark** 2. Clear, neat and stamped work methodology- **2 marks**	**3 marks**
	TOTAL S			**100 marks**

.**Bidders who shall attain less than 70% will not be evaluated at financial stage**

NOTE: **Due diligence shall be carried out on all information provided.**

- All the documents provided shall be verified from the issuing Bodies.
- Any form of forgery or misinformation from the bidder shall lead to cancellation of the bid award

Stage 3: Financial Evaluation

At this stage, bidders' financial quotations will be ranked from the lowest to the highest. The Lowest Evaluated Tender price shall be selected for award of contract.

3. Tender Evaluation (ITT 35)

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

i) Alternative Completion Times: Not Permitted

ii) Alternative Technical Solutions: Not Permitted

iii) Other Criteria; if permitted under ITT 35.2(d): **Not Permitted**

4. Multiple Contracts

Multiple contracts will be permitted in accordance with ITT 35.4. Tenderers are evaluated on basis of Lots and the lowest evaluated tenderer identified for each Lot. The Procuring Entity will select one Option of the two Options listed below for award of Contracts.

OPTION 1: N/A

i) If a tenderer wins only one Lot, the tenderer will be awarded a contract for that Lot, provided the tenderer meets the Eligibility and Qualification Criteria for that Lot.

ii) If a tenderer wins more than one Lot, the tender will be awarded contracts for all won Lots, provided the tenderer meets the aggregate Eligibility and Qualification Criteria for all the Lots. The tenderer will be awarded the combination of Lots for which the tenderer qualifies and the others will be considered for award to second lowest the tenderers.

OPTION 2:N/A

The Procuring Entity will consider all possible combinations of won Lots [contract(s)] and determine the combinations with the lowest evaluated price. Tenders will then be awarded to the Tenderer or Tenderers in

the combinations provided the tenderer meets the aggregate Eligibility and Qualification Criteria for all the won Lots.

3. Alternative Tenders (ITT 13.1): Not Permitted

4. **Margin of Preference is not applicable**

5. Post qualification and Contract ward (ITT 39), more specifically,

Tender will be subjected to post qualification criteria

a) In case the tender was subject to post-qualification, the contract shall be awarded to the lowest evaluated tenderer, subject to confirmation of pre-qualification data, if so required.

b) In case the tender was not subject to post-qualification, the tender that has been determined to be the lowest evaluated tenderer shall be considered for contract award, subject to meeting each of the following conditions.

i) The Tenderer shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow of Kenya Shillings 50,000,000.00

ii) Minimum average annual construction turnover of **Kenya Shillings 50,000,000.00** equivalent calculated as total certified payments received for contracts in progress and/or completed within the last 5 years.

iii) At least **3No.** of contract(s) of a similar nature executed within Kenya, or the East African Community or abroad, that have been satisfactorily and substantially completed as a prime contractor, or joint venture member or sub-contractor each of minimum value **Kenya shillings 50,000,000.00** equivalents.

iv) Contractor's Representative and Key Personnel, which are specified as**: Site Agent, Surveyor, Foreman (Civil Works) and mason**s (As indicated in the evaluation criteria.)

v) Contractors key equipment listed on the table "**Contractor's Equipment" specifically listed as [specify requirements for each lot as applicable]: HDPE Butt Fusion Machine, Concrete Mixer, Poker Vibrator (40mm – 60mm), Excavators with a provision for a rock breaker, and Pick-Up – 10 Ton.** (As indicated in the evaluation criteria.

vi) Other conditions depending on their seriousness.

a) **History of non-performing contracts**:
Tenderer and each member of JV in case 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 3 *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 3 *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.

NYAHURURU WATER AND SANIATION COMPANY LIMITED
QUALIFICATION FORMS SUMMARY

1		**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 3.6	Forms ELI – 1.1 and 1.2, with attachments	
2	Tax Obligations for Kenyan Tenderers	Has produced a current tax clearance certificate or tax exemption certificate issued by the Kenya Revenue Authority in accordance with ITT 3.14.	Form of Tender	
3	Conflict of Interest	No conflicts of interest in accordance with ITT 3.3	Form of Tender	
4	PPRA Eligibility	Not having been declared ineligible by the PPRA as described in ITT 3.8	Form of Tender	
5	State- owned Enterprise	Meets conditions of ITT 3.7	Forms ELI – 1.1 and 1.2, 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 4.1	Forms ELI – 1.1 and 1.2, 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 [……./].	Form CON-2	
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 19.9	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	
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 *[insert amount]* equivalent for the subject contract(s) net of the Tenderer's other commitments. (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	Form FIN – 3.1, with attachments	

1		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)***
		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 *[insert number of years]* years shall be submitted and must demonstrate the current soundness of the Tenderer's financial position and indicate its prospective long-term profitability.		
12	Average Annual Construction Turnover	Minimum average annual construction turnover of Kenya Shillings *[insert amount]*, equivalent calculated as total certified payments received for contracts in progress and/or completed within the last *[insert of year]* years, divided by *[insert number of years]* years	Form FIN – 3.2	
13	General Construction Experience	Experience under construction contracts in the role of prime contractor, JV member, sub-contractor, or management contractor for at least the last *[insert number of years]* years, starting 1st January *[insert year]*.	Form EXP – 4.1	
14	Specific Construction & Contract Management Experience	A minimum number of *3.no* similar contracts specified below that have been satisfactorily and substantially completed as a prime contractor, joint venture member, management contractor or sub-contractor between 1st January 2020 and tender submission deadline 3number contracts, each of minimum value Kenya shillings…….. equivalent. [*In case the Works are to be tender as individual contracts under multiple contract procedure, the minimum number of contracts required for purposes of evaluating qualification shall be selected from the options mentioned in ITT 35.4]* The similarity of the contracts shall be based on the following: [*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 including part of the requirements that may be met by specialized subcontractors, if permitted in accordance with ITT 34.3]*	Form EXP 4.2(a)	

1		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)***
15	Key Technical staff	Provide detailed proposal of key technical members for the proposed project, copies and CV of the proposed team, Enclose detailed certificate a) **1 no. Site Engineer** Degree holder in Civil, water or related engineering with over 7 years' experience and registered by EBK as a professional engineer b**) 1no. Site Foreman** Degree holder in Civil, water or related engineering with over 5 years' experience c) **1no. Surveyor** Minimum of a diploma in surveying with over 3 years' experience d) **5 no. Pipe fitters** with over 5 years' experience and registered by NCA e) 2 no. **Masons**: with over 5 years' experience and registered by NCA	Proof of certified certificates and CVs	
16	Equipment ownership /lease agreement	Equipment (proof of valid ownership / lease agreement) a) **HDPE Butt** fusion and generator b) **Backhoe** c) Transportation **truck** at least 10 tone d) **Pickup** up truck **e) Hiab truck – 1** f**) Dewatering** pumps 5.5hp and above g) **Concrete** Mixer and **Poker vibrator** (40mm-60mm) h) **Set of survey** equipment (Automatic level, survey staff, ranging rods etc) **i) Pedestrian roller**		

SECTION III: QUALIFICATION FORMS
FORM EQU: 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 location	
	Details of current commitments	
Source	Indicate source of the equipment ☐ Owned ☐ Rented ☐ Leased ☐ Specially manufactured	

Omit the following information for equipment owned by the Tenderer.

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

FORM PER -1

Contractor's Representative and Key Personnel Schedule

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

Contractor' Representative and Key Personnel

1.	**Title of position: Contractor's Representative**	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
2.	**Title of position:** *[_____]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
3.	**Title of position:** *[_____]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
4.	**Title of position:** *[_____]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
5.	**Title of position:** *[insert title]*	
	Name of candidate	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]

`

FORM PER-2:

Resume and Declaration - Contractor's Representative and Key Personnel.

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

Name of Tenderer

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

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

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

DECLARATION

I, the undersigned *[insert either "Contractor's Representative" or "Key Personnel" as applicable]*, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

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

Commitment	**Details**
Commitment to duration of contract:	*[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]*
Time commitment:	*[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]*

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 the Tenderer:

Signature: _____

Date: (day month year): _____

SECTION IV: TENDERER'S QUALIFICATIONWITHOUT 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.

FORM ELI -1.1

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: _____ E-mail address: _____
1. Attached are copies of original documents of ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with 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, in accordance with ITT 3.8, documents establishing: • Legal and financial autonomy • Operation under commercial law • Establishing that the Tenderer is not under the supervision of the Procuring Entity 2. Included are the organizational chart and a list of Board of Directors.

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:
JV member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITT 3.6. ☐ In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and that they are not under the supervision of the Procuring Entity, in accordance with ITT 3.8. 2. Included are the organizational chart and a list of Board of Directors.

FORM CON – 2

Historical Contract Non-Performance, Pending Litigation and Litigation History

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

Non-Performed Contracts in accordance with Section III, Evaluation and Qualification Criteria			
☐ Contract non-performance did not occur since 1st January *[insert year]* specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1. ☐ Contract(s) not performed since 1st January *[insert year]* specified in Section III, Evaluation and Qualification Criteria, requirement 2.1			
Year	**Non-performed portion of contract**	**Contract Identification**	**Total Contract Amount (current value, currency, exchange rate and Kenya Shilling equivalent)**
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Procuring Entity: *[insert full name]* Address of Procuring Entity: *[insert street/city/country]*	*[insert amount]*

		Reason(s) for nonperformance: *[indicate main reason(s)]*	
Pending Litigation, in accordance with Section III, Evaluation and Qualification Criteria			
☐ 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.			

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:	

Litigation History in accordance with Section III, Evaluation and Qualification Criteria

☐ No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4.
☐ Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4 as indicated below.

Year of award	**Outcome as percentage of Net Worth**	**Contract Identification**	**Total Contract Amount (currency), Kenya Shilling Equivalent (exchange rate)**
[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]

FORM FIN – 3.1:

Financial Situation and Performance

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

4.4.1. Financial Data

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

*Refer to ITT 15 for the exchange rate

4.4.2 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 Shilling equivalent)**
1		
2		
3		

4.4.3 Financial documents

The Tenderer and its parties shall provide copies of financial statements for _____years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.1. The financial statements shall:

(a) reflect the financial situation of the Tenderer or in case of JV member, and not an affiliated entity (such

as parent company or group member).
(b) be independently audited or certified in accordance with local legislation.
(c) be complete, including all notes to the financial statements.
(d) correspond to accounting periods already completed and audited.
(e) attach three months' bank statements
☐ Attached are copies of financial statements[1] for the _____years required above; and complying with the requirements

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]	*[insert amount and indicate currency]*		
Average Annual Construction Turnover *			

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

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 cash flow demands of the subject contract or contracts as specified in Section III, Evaluation and Qualification Criteria

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

FORM FIN – 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

[1] If the most recent set of financial statements is for a period earlier than 36 months from the date of Tender, the reason for this should be justified.

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					
	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)]**

FORM EXP - 4.1

General Construction Experience

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

Page _____of _____pages

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: _____	

FORM EXP - 4.2(a) N/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	Prime Contractor ☐	Member in JV ☐	Management Contractor ☐	Sub-contractor ☐
Total Contract Amount			**Kenya Shilling**	
If member in a JV or sub-contractor, specify participation in total Contract amount				
Procuring Entity's Name:				
Address: Telephone/fax number E-mail:				

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

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

FORM EXP - 4.2(b)(N/A)

Construction Experience in Key Activities
Tenderer's Name: _____
Date: _____
Tenderer's JV Member Name: _____
Sub-contractor's Name[2] (as per ITT 34): _____
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: _

	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				
Procuring Entity's Name:				
Address: Telephone/fax number E-mail:				
Description of the key activities in accordance with Sub-Factor 4.2(b) of Section III:				

2. Activity No. Two

OTHER FORMS

1.FORM OF TENDER
(Amended and issued pursuant to PPRA CIRCULAR No. 02/2022)

INSTRUCTIONS TO TENDERERS

i) All italicized text is to help the Tenderer in preparing this form.

ii) The Tenderer must prepare this Form of Tender on stationery with its letterhead clearly showing the Tenderer's complete name and business address. Tenderers are reminded that this is a mandatory requirement.

[2] If applicable

iii) Tenderer must complete and sign CERTIFICATE OF INDEPENDENT TENDER DETERMINATION and the SELF DECLARATION FORMS OF THE TENDERER as listed under (s) below.

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

Name and Identification: .....*[insert identification] 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 the Works as soon as is reasonably possible after the receipt of the Project Manager's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Special 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 a binding 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 28;

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]*

vi Option 1, in case 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

Option 2, 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*];

vii) *Discounts:* The discounts offered and the methodology for their application are:

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

ix) 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*];

x) *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;

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

xii) *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 ITT 3.4, other than alternative Tenders submitted in accordance with ITT 13.3;

xiii) *Suspension and Debarment:* We, along with any of our subcontractors, suppliers, Project Manager, 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.

xiv) *State-owned enterprise or institution:* [*select the appropriate option and delete the other*] [*We are not a state-owned enterprise or institution*] / [*We are a state-owned enterprise or institution but meet the requirements of ITT 3.8*];

xv) 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.")

xvi) 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;

xvii) 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;

xviii) 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;

xix) 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.

xx) We undertake to adhere by the Code of Ethics for Persons Participating in Public Procurement and Asset Disposal, copy available from_____(*specify website*) during the procurement process and the execution of any resulting contract.

xxi) **Beneficial Ownership Information:** We commit to provide to the procuring entity the Beneficial Ownership Information in conformity with the Beneficial Ownership Disclosure Form upon receipt of notification of intention to enter into a contract in the event we are the successful tenderer in this subject procurement proceeding.

xxii) We, the Tenderer, have duly completed, signed and stamped the following Forms as part of our Tender:

xxiii) Tenderer's Eligibility; Confidential Business Questionnaire – to establish we are not in any conflict to interest.

xxiv) Certificate of Independent Tender Determination – to declare that we completed the tender without colluding with

other tenderers.

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

xxvi) 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*]

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

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

Date signed_____day of_____, _____

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.

(a) **Tenderer's details**

	ITEM	DESCRIPTION
1	Name of the Procuring Entity	
2	Reference Number of the Tender	
3	Date and Time of Tender Opening	
4	Name of the Tenderer	
5	Full Address and Contact Details of the Tenderer.	1. Country 2. City 3. Location 4. Building 5. Floor 6. Postal Address 7. Name and email of contact person.
6	Current Trade License Registration Number and Expiring date	
7	Name, country 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 Tenderer 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

b) Sole Proprietor, provide the following details.

Name in full_____Age_____ Nationality_
_____Country of Origin_____ Citizenship _____
_____

c) Partnership, provide the following details.

	Names of Partners	Nationality	Citizenship	% Shares owned
1				
2				
3				

d) Registered Company, provide the following details.

i) Private or public Company_____

ii) State the nominal and issued capital of the Company_____ Nominal

Kenya Shillings (Equivalent)..... Issued Kenya Shillings

(Equivalent).....

iii) Give details of Directors as follows.

	Names of Director	Nationality	Citizenship	% Shares owned
1				
2				
3				

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

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

If yes, provide details as follows.

	Names 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 controls, is 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	Tender has a relationship with another tenderer, directly or through common third parties that puts it in a position to influence the tender of another tenderer, or influence the decisions of the Procuring Entity regarding this tendering process.		
5	Any of the Tenderer's affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the tender.		
6	Tenderer would be providing goods, works, non-consulting services or consulting services during implementation of the contract specified in this Tender Document.		
7	Tenderer has a close business or family relationship with a professional staff of the Procuring Entity who are directly or indirectly involved in the preparation of the Tender document or specifications of the Contract, and/or the Tender evaluation process of such contract.		
8	Tenderer has a close business or family relationship with a professional staff of the Procuring Entity who would be involved in the implementation or supervision of such Contract.		
9	Has the conflict stemming from such relationship stated in item 7 and 8 above been resolved in a manner acceptable to the Procuring Entity throughout the tendering process and execution of the Contract?		

f)Certification

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

Full Name_____

Title or Designation_____

_____ _____

(Signature) *(Date)*

B. CERTIFICATE OF INDEPENDENT TENDER DETERMINATION

I, the undersigned, in submitting the accompanying Letter of Tender to the_____[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 the Tender on behalf of the Tenderer;

4.For the purposes of this Certificate and the Tender, I understand that the word "competitor" shall include any individual or organization, other than the Tenderer, whether or not affiliated with the Tenderer, who:
a) has been requested to submit a Tender in response to this request for tenders;
b) could potentially submit a tender in response to this request for tenders, based on their qualifications, abilities or experience;

5.The Tenderer discloses that [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) the Tenderer has entered into consultations, communications, agreements or arrangements with one or more competitors regarding this request for tenders, and the Tenderer discloses, in the attached document(s), complete details thereof, including the names of the competitors and the nature of, and reasons for, such consultations, communications, agreements or arrangements;

6.In particular, without limiting the generality of paragraphs (5)(a) or (5)(b) above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
a) prices;
b) methods, factors or formulas used to calculate prices;
c) the intention or decision to submit, or not to submit, a tender; or
d) the submission of a tender which does not meet the specifications of the request for Tenders;
except as specifically disclosed pursuant to paragraph (5)(b) above;

7.In addition, there has been no consultation, communication, agreement or arrangement with any competitor regarding the quality, quantity, specifications or delivery particulars of the works or services to which this request for tenders relates, except as specifically authorized by the procuring authority or as specifically disclosed pursuant to paragraph (5)(b) above;

8.the terms of the Tender have not been, and will not be, knowingly disclosed by the Tenderer, directly or indirectly, to any competitor, prior to the date and time of the official tender opening, or of the awarding of the Contract, whichever comes first, unless otherwise required by law or as specifically disclosed pursuant to paragraph (5)(b) above.

Name_____ Title__ Date _____

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

C. SELF - DECLARATION FORMS

FORM SD1

SELF DECLARATION THAT THE PERSON/TENDERER IS NOT DEBARRED IN THE MATTER OF THE PUBLIC PROCUREMENTAND ASSET DISPOSALACT 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 deposed to herein above is true to the best of my knowledge, information and belief.

……. ……. …… (Title)
(Signature) (Date)

Bidder Official Stamp

FORM SD2

SELF DECLARATION THAT THE PERSON/TENDERER WILL NOT ENGAGE IN ANY CORRUPT OR FRAUDULENT PRACTICE

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

1.THAT I am the Chief Executive/Managing Director/Principal Officer/Director of ……..... *(insert name of the Company)* who is a Bidder in respect of Tender No. ….....……. for …….. *(insert tender title/description)* for …… *(insert name of the Procuring entity)* and duly authorized and competent to make this statement.

2.THAT the aforesaid Bidder, its servants and/or agents /subcontractors will not engage in any corrupt or fraudulent practice and has not been requested to pay any inducement to any member of the Board, Management, Staff and/or employees and/or agents of ……... *(insert name of the Procuring entity)* which is the procuring entity.

3.THAT the aforesaid Bidder, its servants and/or agents /subcontractors have not offered any inducement to any member of the Board, Management, Staff and/or employees and/or agents of ……. (name of the procuring entity)

4.THAT the aforesaid Bidder will not engage /has not engaged in any corrosive practice with other bidders participating in the subject tender

5.THAT what is deponed to herein above is true to the best of my knowledge information and belief.

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

Bidder's Official Stamp

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

2. 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.

3. Requirements

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.

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 direct or 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.

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 the investigation or making false statements to investigators in order to materially impede investigation by Public Procurement Regulatory Authority (PPRA) or any other appropriate authority appointed by Government of Kenya into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or
- acts intended to materially impede the exercise of the PPRA's or the appointed authority's inspection and audit rights provided for under paragraph 2.3 e. below.

b) Defines more specifically, in accordance with the above procurement Act provisions set forth for fraudulent and collusive practices as follows:

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

c) Rejects a proposal for 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.

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

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

FORM OF TENDER SECURITY- [Option 1–Demand Bank Guarantee]

Beneficiary:_____ Request for
Tenders No:_____Date:_____
_____ TENDER
GUARANTEE No.:_____
Guarantor: _____

1. We have been informed that_____(here in after called "the Applicant") has submitted or will submit to the Beneficiary its Tender (here in 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 thereto provided by the Applicant; or

b) having been notified of the acceptance of its Tender by the Beneficiary during the Tender Validity Period or any extension there to provide 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) thirty 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)]

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

FORMAT OF TENDER SECURITY [Option 2–Insurance Guarantee]

TENDER GUARANTEE No.: _____

1. Whereas …… [*Name of the tenderer]* (hereinafter called "the tenderer") has submitted its tender dated …… [*Date of submission of tender]* for the …… *[Name and/or description of the tender]* (hereinafter called "the Tender") for the execution of__under Request for Tenders No._____("the ITT").

2. KNOW ALL PEOPLE by these presents that WE …… of …… [**Name of Insurance Company**] having our registered office at …… (hereinafter called "the Guarantor"), are bound unto ……. [*Name of Procuring Entity*] (hereinafter called "the Procuring Entity") in the sum of …… (Currency and guarantee amount) for which payment well and truly to be made to the said Procuring Entity, the Guarantor binds itself, its successors and assigns, jointly and severally, firmly by these presents.

Sealed with the Common Seal of the said Guarantor this ___day of _____ 20 __.

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

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 Procuring Entity during the Tender Validity Period or any extension thereto provided by the Principal; (I) failed to execute the Contract agreement; or (ii) has failed to furnish the Performance Security, in accordance with the Instructions to tenderers ("ITT") of the Procuring Entity's Tendering document.

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

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.

_____ _____

[Date] *[Signature of the Guarantor]*

_____ _____

[Witness] *[Seal]*

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

TENDER-SECURING DECLARATION FORM

[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

APPENDIX TO TENDER

Schedule of Currency requirements

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

Name of currency	***Amounts 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]

PART II - WORK REQUIREMENTS

SECTION V – DRAWINGS

NYAHURURU WATER AND SANITATION COMPANY LTD

UPGRADING AND REHABILITATION OF WATER PIPE NETWORK IN NYAHURURU MUNICAPILITY IN;
i) LUMUMBA, SITE PHASE I, KIANO AND UPPER CORE
ii) LOWER CORESIT
iii) GARDEN ESTATE

TENDER REF NO: NYAHUWASCO/CLSG 2/OT/015/2024-2025

TECHNICAL SPECIFICATIONS

June, 2025

Clause No.	CLAUSE
1	GENERAL REQUIREMENTS
1.1	**TEMPORARY WORKS AND SERVICES**
1.1.1	***DOCUMENTS GENERALLY***
	The Works: comprise of the construction to completion of 'Upgrading and Rehabilitation of Water Pipe Networks in Nyahururu Town' The project involves the Rehabilitation of Water Distribution Network within the Nyahururu Town Area.This is a project of the Nyahururu Water and Sanitation Company, financed through World Bank Conditional Liquidity Support Grant II Agreement through the Water Sector Trust Fund '
1.1.1.A	The scope of the works covers the following main elements: 1 Construction of 48km of water distribution lines. 2 Construction of Manholes and Pipework Ancillaries. 3 Re-connection of existing customers to rehabilitation network.
1.1.1.B	Phasing of Work: The phasing of the work will be developed by the Employer and Contractor upon consideration of the Contractor's proposals for the programme of works and construction activities. The Contractor is to prepare his program in accordance with Section 1.3.1 of this document.
1.1.1.C	Sequence of construction: The Contractor shall prepare a construction sequence in conformity with his construction programme. Such a logic must include planned procedures materialized as program activities to cover the phasing of the Works during construction and maintenance of service during construction.
1.1.2	***THE SITE***
1.1.2.A	The site: is described on Drawings; the contractor shall make all necessary arrangements, including payment if need be, regarding any land outside the Site that may be needed as work areas. The Employer will not acknowledge any liability in respect of such land. The Contractor shall also be responsible for insuring that all roads and temporary facilities needed are sufficient to divert traffic adequately, if necessary.
1.1.2.B	Contractor's Site Compound: The Contractor shall locate and select sites outside the right-of-way for the use of his plant, equipment, site offices, residences, Temporary Works or any other uses which are essential during the execution of the Contract. The Contractor's site compound details should take into account the proposed construction camp. The Contractor shall take the necessary measures for using these sites.
1.1.2.C	Existing Obstacles: shall include, but not be limited to existing buildings, steel bridges and the like, walls, fences, gates, wells, septic tanks, manholes, pits, pipes, culverts, roadways, sidewalks, signs and rubbish dumps, whether or not shown on the Drawings. The contractor shall, during the execution of the Contractual Works, examine the Site and identify/verify the obstacles within the right-of-way above or below ground, and shall record all such information on suitable Site Drawings which shall be submitted to the Employer's Representative within the agreed program but prior to commencement of the affected part of the Work.
1.1.2.D	Utility Diversions: The necessary utility diversions, either temporary or permanent, may be specified or directed to be carried out by the Contractor. Alternatively, the Employer may make arrangements for such works to be executed by other parties, normally the Utility Owners. In the event the utility diversions are specified or directed to be executed by the Contractor, the Contractor shall take into account that the diversion works will be carried out to the requirements and approval of the Utility Owners and/or under their supervision. The extent of the utility diversions have been, but are not limited to, described in the Documents.
1.1.2.E	Site Investigations: Site investigation shall be carried out by the Contractor and factual reports giving results of boreholes. In situ tests shall be submitted to the Engineer all in accordance to the requirements set in the Specifications and Contract Documents. Unless otherwise stated the Contractor shall allow in his unit rates and prices in the Bill of Quantities for the complete site investigation, required including the factual reports giving results of in situ tests. Any information or data, whether expressed or implied, given in the Tender or Contract Documents in respect of climatological, hydrological, geophysical and sub-surface conditions, shall not be construed nor deemed to construe any passing of responsibility to the Employer or the Engineer for the correctness, accuracy, validity or use of any such information and data. The Contractor shall be responsible for his own assessment, interpretation and evaluation.
1.2	**DOCUMENTS AND DRAWINGS**
1.2.1	***REFERENCING***

Clause No.	CLAUSE
	: The Specifications for Items in the Bills of Quantities are prescribed in the respective Section/s corresponding to the type of Works involved.
1.2.1.A	All provisions of such Section/s shall be construed as Specifications for such Item of Work, except in respect of those provisions clearly inapplicable in the context in which they appear or unless they are waived or modified in the Contract Documents or by Variation Order. Specifications and Drawings may contain cross references to other Sections, Clauses, Items, etc., which shall likewise be construed as Specifications for the Item of Work involved. Any references in the Specifications to Work or materials not required by the Contract, will be deemed not to apply.
1.2.2	***SYMBOLS*** : Throughout the documentation units of measurement are referred to by symbols as follows:
1.2.2.A	No. - number mm - millimeter(s) cm - centimeter(s) m - meter(s) lin.m - linear meter km kilometer(s) sq.mm- square millimeter(s) sq.cm - square centimeter(s) sq.m - square meter(s) ha - hectare(s) cu.m - cubic meter(s) gm - gram(s) kg - kilogram tonne - metric ton (1,000 kg) ml - milliliter(s) ltr - liter(s) Pa - Pascal(s) N - Newton(s) kN - kilo Newtons MN - mega Newtons A - amperes mA - milli amperes V - volt(s) w - Watt kW - kilowatt C - Celsius (Centigrade) Hz - Hertz (Frequency) rpm - revolutions per minute km/h - kilometers per hour sec seconds mm - minute(s) (or minimum) h - hour(s) mS - milli Siemens
1.2.3	***DEFINITIONS*** : Given in the documents apply to terms, derived terms and synonyms in all documents. Near synonymous terms are to be interpreted in the light of the definitions.
1.2.3.A	Wherever in the Specification or in other Contract Documents any of the following terms is used, the intent and meaning shall be interpreted as follows:
1.2.3.B	Accepted: Accepted in writing by the Employer's Representative (or by the Employer where appropriate) as meeting the requirements of the Contract Documents and of any authorized variations thereto. "Acceptance" means accepted in writing as aforesaid. "Acceptable" means acceptable to the Employer's Representative as aforesaid.
1.2.3.C	Addendum: of/or revision to any of the Contract Documents issued to Tenderers, and which is deemed to form part of the Contract Documents.
1.2.3.D	Approved: in writing by the Employer's Representative, including subsequent written approval or confirmation of previous verbal approval by the Employer's Representative. "Approval" means approval in writing as aforesaid.

Clause No.	CLAUSE
1.2.3.E	Certificate of Guarantee: A signed statement by a person having legal authority to bind a company or supplier to its product, and which confirms that the materials and test results conform to the standards of these Specifications.
1.2.3.F	Instructed: Directed in writing by the Employer's Representative, including subsequent written direction or confirmation of previous verbal direction by the Employer's Representative.
1.2.3.G	Working Drawings: Shop Drawings, steel bending schedules, stress sheets, fabrication and erection Drawings, falsework Drawings, and any other supplementary.
1.2.4	***DRAWINGS***
1.2.4.A	CONTRACT DRAWINGS : are detailed on Drawing identified as List of Drawings.
1.2.4.B	DIMENSIONS AND DETAILS: Drawings are not to be scaled. Take all sizes from the dimensions shown on the Drawings or, where appropriate, as measured on site.
1.2.5	***DRAWINGS PROVIDED BY THE CONTRACTOR***
1.2.5.A	GENERAL: The Employer's Representative will supplement the Contract Drawings with further Drawings as he deems necessary. The Contractor shall Prepare all other Drawings required for Temporary Works and for fabrication and co-ordination of trades and other Drawings and documents required under the Contract, in addition to Drawings for work to be designed by the Contractor.
1.2.5.B	DESIGN: The Employer's Representativeshall prepare and submit for approval, Specifications, calculations, manufacturers' data etc. as required by the Specification or instructed by the Employer's Representative in good time to meet the programme. Drawings shall be carefully checked before submission to ensure that no conflict exists with other parts of the work, and shall be presented in accordance with submittal Procedure
1.2.5.C	SUPPORTING DATA: such as manufacturers' standard details, performance standards etc. are to be in English, or accompanied by a translation, and are to be properly referenced to the Drawings and Specification and to be presented in accordance with Procedures Note 1. Submittals for Product Data (included at the end of this Section).
1.2.5.D	PROCEDURE FOR SUBMISSION AND APPROVAL.: (1) Submit two copies of Drawings and other documents for approval to the Employer's Representative. (2) Within 21 days of receipt at the Employer's Representative's design office, the Employer's Representative will return one copy of the Drawings stamped as: (a) approved, or (b) approved as noted subject to amendments shown on the returned copy or in an accompanying letter, or (c) revise and resubmit, with recommendations for resubmission (d) receipt acknowledge, for information (3) In the case of approval, work may be commenced, or orders placed. (4) Provide four copies, and reproducible copy if required, of all approved material in accordance with the Conditions of Contract, or as agreed with the Employer or the Employer's Representative.
1.2.5.E	"AS-BUILT" DRAWINGS: : The Contractor shall neatly and professionally prepare as-built Drawings for all work completed, on reproducible copies of the Drawings and on electronic diskette in a program stipulated by the Employer's Representative for all the trades, designed by the Contractor in accordance with the provision of the Conditions of the Contract to clearly show all requested details and other applicable Drawings and sketches prepared for the work as required (being Drawings which the Contractor or any Subcontractor has to prepare for the purpose of the Works) and shall transmit the As-Built Drawings to the Employer's Representative on a continuous basis before completion of construction but in all cases prior to issuance of the Certificate of Completion of the Works. The Contractor shall maintain on Site one complete set of the Contract which shall be available to the Employer's Representative at all times and upon which the Contractor shall record on a continuous basis all changes and field adjustments. On a continuous basis shall mean as the work is progressively accomplished in relation to each Drawing.
1.2.5.F	OPERATION AND MAINTENANCE MANUALS:: Where required under the provision of the Conditions of Contract and where required by the Specification, the Contractor shall provide two copies of operation and maintenance manuals for equipment and installations. Manuals are to be in English and are to be properly bound in good quality hard covers and shall be submitted in accordance with Procedure Note 2: Operation and Maintenance Manuals (included at the end of this section).
1.2.5.G	COMPLETION: The works shall not be considered as complete for the purposes of the Taking Over under the provision of the Contract until the "as-built" Drawings and instruction and maintenance manuals have been provided.
1.2.6	***SPECIFICATIONS***

Clause No.	CLAUSE
1.2.6.A	CROSS-REFERENCES: Where Specification section numbers or type of work numbers are given on the Drawings or in the Bill of Quantities they are intended to help define the part or parts of the Specification which apply to particular kinds of work or parts of the Works. If the references are to specific items or kinds or types of work within a section of the Specification, they must be taken as applying to the section as a whole, including all other relevant information. The references are not exclusive of other relevant information and requirements stated in other parts or sections of the Specification. The Specification as a whole must be taken as applying to the Works as a whole.
1.2.6.B	STANDARDS DOCUMENTS: Where references are made to standards, codes of practice and Specifications issued by international bodies and organisations they are referred to by the following abbreviations: AASHTO (American Association of State Highway and Transportation Officials) ACI (American Concrete Institute) AGA (American Gas Association) AISC (American Institute of Steel Construction) AMCA (Air Moving and Conditioning Association) ANSI (American National Standards Institute) ASA (American Standards Association) ASHRAE (American Society of Heating, Refrigerating and Air conditioning Project Managers) ASME (American Society of Mechanical Project Managers) ASTM (American Society for Testing and Materials) AWWA (American Water Works Association) BS (British Standards) BS CP (British Standards Codes of Practice) CMA (Cable Manufacturers Association) DIN (Deutsches Institut fur Normalisierung) DTU (Documents Techniques Unifies) FM (Factory Mutual) IBR (Institute of Boiler and Radiator Manufacturers) ISO (International Standardisation Organisation) KEBS (Kenya Bureau of Standards) NBS (National Bureau of Standards) NEMA (National Electrical Manufacturers Association) NF (Normes Francaises) NFPA (National Fire Protection Association) NFS (National Sanitation Foundation) SAE (Society of Automotive Project Managers) UL (Underwriters' Laboratories Inc.) VDE (Verband Deutscher Electrotechniker)
1.2.6.C	STANDARDS DOCUMENTS: Where references are made and year of issue and amendments are not stated they are in every case to be deemed to include the latest edition or issue of such standard, current at the time of Tender.
1.2.6.D	STANDARDS DOCUMENTS: Materials and workmanship conforming to national and international standards identical to, or technically equivalent to, standards specified may be used in the works subject to approval. Submit data, set out in the form of a comparative study and statement as evidence of the above.
1.2.6.E	STANDARDS DOCUMENTS: The Contractor shall maintain on site copies of all standards referred to on the Drawings or in the Specification, for Site use.
1.2.6.F	MANUFACTURER AND REFERENCE: Where used m this combination: "manufacturer (Man:)" means the firm under whose name the particular product is marketed "reference (Ref.:)" means the proprietary brand name and/or reference by which the particular product is identified
1.2.6.G	"MANUFACTURER'S RECOMMENDATIONS" : means the manufacturer's current recommendations or instructions, printed or 1n writing.
1.2.6.H	"OR OTHER EQUAL AND APPROVED": means that products of other manufacture may be substituted if prior approval has been obtained. The Engineer reserves the right to insist on the products specified. The rates or prices will be held to be based on the products specified, unless agreed otherwise.

Clause No.	CLAUSE
	ABBREVIATIONS: : Wherever the following abbreviations of titles, terms and units of measurement are used in the Specifications or on the Drawings, the intent and meaning shall be interpreted as described hereunder. AASHTO- American Association of State Highway and Transportation Officials ABS Acrylonitrile-Butadiene-Styrene ACI American Concrete Institute AISC American Institute of Steel Construction AISI American Iron and Steel Institute ANSI American National Standards Institute API American Petroleum Institute ASTM American Society for Testing and Materials AV. average
1.2.6.I	AWG American wire gauge AWS American Welding Society bit. bitumen/bituminous BS British Standard BSSC bituminous slurry seal coat BST bituminous surface treatment CB circuit breaker CBR California Bearing Ratio cone concrete CIE Commission Internationale de l'Eclairage DBSC - double bituminous seal coat DIN Deutsches Institute Fur Normalizieung Equiv equivalent FSS Federal Standard Specification (USA) HDPE High-Density Polyethylene ABBREVIATIONS: : Wherever the following abbreviations of titles, terms and units of measurement are used in the Specifications or on the Drawings, the intent and meaning shall be interpreted as described hereunder. AASHTO- American Association of State Highway and Transportation Officials ABS Acrylonitrile-Butadiene-Styrene ACI American Concrete Institute AISC American Institute of Steel Construction AISI American Iron and Steel Institute ANSI American National Standards Institute API American Petroleum Institute ASTM American Society for Testing and Materials AV. average
1.2.6.I	AWG American wire gauge AWS American Welding Society bit. bitumen/bituminous BS British Standard BSSC bituminous slurry seal coat BST bituminous surface treatment CB circuit breaker CBR California Bearing Ratio cone concrete CIE Commission Internationale de l'Eclairage DBSC - double bituminous seal coat DIN Deutsches Institute Fur Normalizieung Equiv equivalent FSS Federal Standard Specification (USA) HDPE High-Density Polyethylene

Clause No.	CLAUSE
1.2.6.J	ABBREVIATIONS: : P.I. plasticity index P .L. plastic limit PQP Project Quality Plan PTFE Polytetrafluoroethylene PVC polyvinyl chloride qty quantity RC reinforced concrete RCP reinforced concrete pipe rdwy roadway ROW right-of-way SBSC single bituminous seal coat S.G. specific gravity SI Systeme International D'Unites Sta Station (location along a survey line) SWG standard wire gauge (UK) triple TBSC bituminous seal coat UPVC unplasticized polyvinyl chloride VDE Verband Deutscher Electrotechniker wgt weight
PN.1	**PROCEDURE NOTE 1**
PN.1.1	***SUBMITTALS FOR FINAL DESIGN DRAWINGS***
PN.1.1.A	Project Design Drawing: Submit newly prepared information, drawn to accurate scale. Do not reproduce Contract Documents or copy standard printed information as the basis of Final Design Drawings. 1. Include the following information on Final Design Drawings: a. Dimensions b. Identification of products and materials included c. Compliance with specified standards d. Notation of co-ordination requirements e. Notation of dimensions established by field measurement. 2. Submit Co-ordination Drawings where required for integration of different construction elements. Show construction sequences and relationships of separate components where necessary to avoid conflicts in utilisation of the space available. 3. Highlight, encircle or otherwise indicate deviations from the Contract Documents on the Final Design Drawings. 4. Do not permit Final Design Drawing copies without an appropriate final stamp or other marking indicating the action taken by the Employer's Representative to be used in connection with construction. 5. Initial Submittal: submit two copies and one reproducible Engineers review; the reproducible print will be returned. 6. Final Submittal: submit a number of copies and one reproducible copy, as agreed with the Employer's Representative
PN.2	**PROCEDURE NOTE 2**
PN.2.1	***SUBMITTALS FOR PRODUCT DATA***

Clause No.	CLAUSE
	Product Data: Collect Product Data into a single submittal for each element of construction or system. Mark each copy to show which choices and options are applicable to the Project. 1. Where Product Data have been printed to include information on several similar products, some of which are not required for use on the Project, or are not included in this submittal, mark copies to clearly indicate which information is applicable. 2. Where Product Data must be specially prepared for required products, materials or systems, because standard printed data are not suitable for use, submit as Final Design Drawings not Product Data. 3. Include the following information in Product Data: a. Manufacturer's printed recommendations b. Compliance with recognised trade association standards c. Compliance with recognised testing agency standards d. Application of testing agency labels and seals
1.2.8.A	e. Notation of dimensions verified by field measurement f. Notation of co-ordination requirements. 4. Do not submit Product Data until compliance with requirements of the Contract. Documents has been confirmed. 5. Submittals: Submit 2 copies of each required Product Data submittal; submit 2 additional copies where copies are required for maintenance manuals. The Engineer will retain one copy, and will return the other marked with the action taken and corrections or modifications required. Unless the Employer's Representative observes non-compliance with provisions of the Contract Documents, the submittal may serve as the final submittal. 6. Distribution: Furnish copies of final Product Data submittal to manufacturers, Subcontractors, suppliers, fabricators, installers, governing authorities and others as required for performance of the construction activities. Show distribution on transmittal forms. 7. Do not permit use of unmarked copies of Product Data in connection with construction
PN.3 ***PN.3.1***	**PROCEDURE NOTE 3** ***INSTRUCTION AND MAINTENANCE MANUALS*** Summary: A. This Procedure Note specifies administrative and procedural requirements for instruction and maintenance manuals including the following: 1. Preparation and submittal of operating and maintenance manuals for building operating systems or equipment.
1.2.9.A	2. Preparation and submittal of instruction manuals covering the care, preservation and maintenance of architectural products and finishes. 3. Instruction of the Employer's operating personnel in operation and maintenance of building systems and equipment. B. Special operating and maintenance data requirements for specific pieces of equipment or building operating systems are included in the appropriate Sections of Divisions-2 through 16 Quality Assurance: A. Maintenance Manual Preparation: In preparation of Maintenance Manuals, use personnel thoroughly trained and experienced in operation and maintenance of the equipment or system involved. 1. Where written instructions are required, use personnel skilled in technical writing to the extent necessary for communication of essential data.
1.2.9.B	2. Where Drawings or diagrams are required, use draftsmen capable of preparing Drawings clearly in an understandable format. B. Instructions for the Owner's Personnel: For instruction of the Employer's operating and maintenance personnel, use experienced instructors thoroughly trained and experienced in the operation and maintenance of the building equipment or system involved.

Clause No.	CLAUSE
1.2.9.C	Submittals A: A.Submittals Schedule: Comply with the following schedule for submittal of operating and maintenance manuals. 1. Before Substantial Completion, when each installation that requires submittal of operating and maintenance manuals is nominally complete, submit two copies of each manual to the Employer's Representative for review. Include a complete index or table of contents of each manual. The Employer's Representative will return one copy (approved or with comments if the case) within twenty-one days of receipt. 2. After final inspection make corrections or modifications to comply with the Employer's Representative's comments, if present. Submit the specified number of copies of each approved manual to the Employer's Representative within fifteen days of receipt of the Employer's Representative's comments.
1.2.9.D	Submittals B: B. Form of Submittal: Prepare operating and maintenance manuals in the form of an instructional manual for use by the Employer's operating personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder. 1. Binders: For each manual, provide heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-1/2" by 11" paper. Provide a clear plastic sleeve on the spine, to hold labels describing the contents. Provide pockets in the covers to receive folded sheets. a. Where two or more binders are necessary to accommodate data, correlate data in each binder into related groupings in accordance with the Project Manual table of contents. Cross reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system. b. Identify each binder on the front and spine, with the typed or printed title "OPERATION AND MAINTENANCE MANUAL", Project title or name, and subject matter covered. Indicate the volume number for multiple volume sets of manuals. 2. Dividers: Provide heavy paper dividers with celluloid covered tabs for each separate Section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the Section on each divider. 3. Protective Plastic Jackets: Provide protective transparent plastic jackets designed to enclose diagnostic software for computerized electronic equipment. 4. Text Material: Where written material is required as part of the manual use the manufacturer's standard printed material, or if it is not available, specially prepared data, neatly typewritten, on 8-1/2" by 11", 20 pound white bond paper. 5. Drawings: Where Drawings or diagrams are required as part of the manual, provide reinforced punched binder tabs on the Drawings and bind in with the text.

Clause No.	CLAUSE
1.2.9.E	Manual Content A: In each manual include information specified in the individual Specification Section, and the following information for each major component of building equipment and its controls. 1. General system or equipment description 2. Design factors and assumptions 3. Copies of applicable Final Design Drawings and Product Data 4. System or equipment identification, including: a. Name of manufacturer b. Model number c. Serial number of each component. 5. Operating instructions 6. Emergency instructions 7. Wiring diagrams 8. Inspection and test procedures 9. Maintenance procedures and schedules 10. Precautions against improper use and maintenance 11. Copies of warranties 12. Repair instructions including spare parts listing 13. Sources ofrequired maintenance materials and related services 14. Manual Index.

Clause No.	CLAUSE
1.2.9.F	Manual Content B: Organize each manual into separate Sections for each piece of related equipment. As a minimum each manual shall contain a title page, a table of contents, copies of Product Data, supplemented by Drawings and written text, and copies of each warranty, bond and service Contract issued. 1. Title Page: Provide a title page in a transparent plastic envelope as the first sheet of each manual. Provide the following information. a. Subject matter covered by the manual b. Name and address of the Project c. Date of submittal d. Name, address, and telephone number of the Employer e. Name and address of the Employer f. Cross reference to related systems in other operating and maintenance manuals. 2. Table of Contents: After the Title Page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume. a. Where more than one volume is required to accommodate data for a particular system, provide a comprehensive table of contents for all volumes in each volume of the set. 3. General Information: Provide a general information Section immediately following the Table of Contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the Subcontractor or installer, and the maintenance contractor. Clearly delineate the extent of responsibility of each of these entities. In addition, list a source for replacement parts and equipment. 4. Product Data: Where manufacturer's standard printed data is included in the manuals, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where more than one item in a tabular format is included, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation and delete references to information that is not applicable.
1.2.9.G	Manual Content c: 5. Written Text: Where manufacturer's standard printed data is not available, and information is necessary for proper operation and maintenance of equipment or systems, or it is necessary to provide additional information to supplement data included in the manual, prepare written text to provide necessary information. Organize the text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operating or maintenance procedure. 6. Drawings: Provide specially prepared Drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems, or to 7. Provide control or flow diagrams. Co-ordinate these Drawings with information contained in Project record Drawings to assure correct illustration of the completed installation. 8. Warranties, Bonds and Service Contracts: Provide a copy of each warranty, bond or service Contract in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to be followed in the event product failure. List circumstances and conditions that would affect validity of the warranty or bond.
1.2.9.H	Material and Finishes Maintenance Manual A: A.Submit four copies of each manual, in final form, on material and finishes to the Employer's Representative for distribution. Provide one section for architectural products, including applied materials and finishes, and a second for products designed for moisture protection and products exposed to the weather. 1. Refer to individual Specification Sections for additional requirements on care and maintenance of materials and finishes.

Clause No.	CLAUSE
1.2.9.I	Material and Finishes Maintenance Manual B: B. Architectural Products: Provide manufacturer's data and instructions on care and maintenance of architectural products. 1. Manufacturer's Data: Provide complete information on architectural products, including the following, as applicable. a. Manufacturer's catalogue number b. Size c. Material composition d. Colour e. Texture f. Reordering information for specially manufactured products. 2. Care and Maintenance Instructions: Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information regarding cleaning agents and methods that could prove detrimental to the product. Include manufacturer's recommended schedule for cleaning and maintenance.
1.2.9.J	Material and Finishes Maintenance Manual C: C. Moisture-Protection and Weather-Exposed Products: Provide complete manufacturer's data with instructions on inspection, maintenance and repair of products exposed to the weather or designed for moisture protection purposes. 1. Manufacturer's Data: Provide manufacturer's data giving detailed information, including the following, as applicable a. Applicable standards b. Chemical composition c. Installation details d. Inspection procedures e. Maintenance information f. Repair procedures
1.2.9.K	Material and Finishes Maintenance Manual D: Schedule: Provide complete information in the materials and finished manual on products as directed by the Employer's Representative.
1.2.9.L	EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL A: A. Submit four copies of each completed manual on equipment and systems, in final form, to the Employer's Representative for distribution. Provide separate manuals for each unit of equipment, each operating system, and each electric and electronic systems. 1. Refer to Specification Sections for additional requirements on operating and maintenance of the various pieces of equipment and operating systems
1.2.9.M	EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL B: B. Equipment and Systems: Provide the following information for each equipment, building operating system, and electric or electronic system. 1. Description: Provide a complete description of units and related component parts, including the following: a. Equipment or system function b. Operating characteristics c. Limiting conditions. d. Performance curves e. Engineering data and tests f. Complete nomenclature and number of replacement parts. 2. Manufacturer's Information: For each manufacturer of equipment provide the following: a. Printed operating and maintenance instructions b. Assembly Drawings and diagrams required for maintenance c. List of items recommended to be stocked as spare parts. 3. Maintenance Procedure: Provide information detailing essential maintenance procedures, including the following: a. Routine operations b. Trouble-shooting guide c. Disassembly, repair and reassembly d. Alignment, adjusting and checking

Clause No.	CLAUSE
1.2.9.N	EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL C: 4. Operating Procedures: Provide information on equipment and system operating procedures, including the following: a. Start-up procedures b. Equipment or system break-in c. Routine and normal operating instructions d. Regulation and control procedures e. Instructions on stopping f. Shut down and emergency instructions g. Summer and winter operating instructions. h. Required sequences for electric or electronic systems i. Special operating instructions. 5. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts. 6. Controls: Provide a description of the sequence of operation and as- installed control diagrams by the control manufacturer for systems requiring controls. 7. Co-ordination Drawings: Provide each Contractor's co-ordination Drawings. a. Provide as-installed colour-coded piping diagrams, where required for identification.
1.2.9.O	EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL D: Schedule: Provide complete information in the equipment and systems manual on products specified as requested by the Employer's Representative. INSTRUCTIONS OF THE EMPLOYER'S PERSONNEL: A. Prior to final inspection, instruct the Employer's personnel in operation, adjustment, and maintenance of products, equipment and systems. Provide instruction at mutually agreed upon times.
1.2.9.P	I. For equipment that requires seasonal operation, provide similar instructions during other seasons. 2. Use operation and maintenance manuals for each equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance
1.3 ***1.3.1***	**MANAGEMENT PROCEDURES** ***COMMENCEMENT, PROGRAMME AND PROGRESS***
1.3.1.A	Commencement: The Employer will prepare a Certificate of Commencement to allow the Contractor to start their Contract. Co-ordination: The Contractor shall co-ordinate the construction activities included therein to assure efficient and orderly installation of each Part of the works. Co- ordinate construction operations included under differing sections of the Specifications that are dependant upon each other for proper installation, connection and operation.
1.3.1.B	1. Where installation of one part of the work is dependant on the installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results. 2. Where availability of space is limited restricted by access or security, co-ordinate installation of the different components to assure maximum accessibility at desired times for required maintenance service and repair. 3. Make adequate provisions to accommodate items scheduled for later installation.
1.3.1.C	Programme: The Contractor shall submit a programme in accordance with Conditions of Contract for the Employer's Representative's review. The programme shall be in bar chart form and shall show at least the following information: (a) start and completion dates and duration of each activity (b) dates and times for procurement and delivery of all important materials and Plant and for work to be performed by Subcontractors (c) dates for supply by the Engineer of Drawings and other (d) dates for submission by the Contractor of Final Design Drawing samples and the like and dates for approval by the Employer's Representative, in accordance with Conditions of Contract and Section 1.02.3 (e) dates and times for testing and commissioning of Plant and engineering installation.
1.3.1.D	Resource Schedules: The Contractor shall provide with the programme schedules showing: (a) numbers and classes of workmen proposed to be employed on the Site (b) Contractor's Equipment and Temporary Works to be supplied or constructed and forecast dates for supply, construction and removal.

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1.3.1.E	Monitoring: The Contractor shall review the progress of the Works and the supply of resources compared with the programme and the schedules of resources, and shall give the Employer's Representative notice of delays incurred or forecast and of any shortage of resources which may affect progress. In addition, the Contractor shall provide revised programmes in accordance with Conditions of Contract, if instructed.
1.3.1.F	Programme: The Contractor shall provide for the Employer's Representative's review in accordance with Conditions of Contract, a computer-based programme in critical path network (CPM) form, showing at least the following information: (a) Contract milestones (Employer's Representative's Notice to commence, Commencement Date, date for completion of the design to be carried out for by the Contractor for part of the permanent works, as set in the Contract documents, date for completion of Sections of the Works, date for completion of the whole of the Works, etc.) (b) duration of each construction activity in working days (c) earliest/latest start and completion dates for each construction activity (d) free float time for each activity (e) total float time for each activity (f) cost of each activity as per Contract rates (g) duration and earliest/latest dates for procurement of materials and Plant (h) duration and earliest/latest dates for activities to be performed by Subcontractors (i) number of working days per week (j) number of working shifts per day for each construction activity (k) activities for Temporary Works to be supplied and constructed and the dates for supply, construction and removal (1) dates for supply by the Engineer of Drawings and other information (m) dates for submission by the Contractor of Final Design Drawing samples and the like and dates for approval by the Employer's Representative, in accordance withConditions of Contract Clauses 18. (n) duration and earliest/latest dates for testing and commissioning plant and engineering installations. (o) bar chart showing earliest dates and total float of activities.
1.3.1.G	Guidance: The Contractor shall abide by the following: (a) The Employer's Representative will guide the contractor in the determination of the level of detail to include in the CPM (b) One day will be the smallest time unit used
1.3.1.H	Hardware: the computer hardware shall be the one agreed with the Employer.
1.3.1.I	Computer Software: Project management software shall be of the professional high-end type (i.e. "Microsoft Project" ®, "Primavera" P5® or of similar capabilities). The Contractor is to identify and submit details of his proposed software programme.
1.3.1.J	Resource Schedules: The computer program used for preparing the programme shall also be used for preparation of resource schedules to be submitted to the Employer's Representative with the programme. The resource schedules shall show at least the following information: (a) numbers and classes of workmen to be employed on the Site for each activity (b) numbers and classes of equipment to be used for each activity (c) histogram for workmen by class and overall classes (d) histogram for equipment by class and overall classes
1.3.1.K	Cash Flow Estimates: The computer program used for preparing the programme shall also be used to prepare the cash flow estimate to be submitted by the Contractor in accordance with Conditions of Contract.
1.3.1.L	Monitoring: The Contractor shall monitor progress of the works and the supply of resources and cash flow compared with the programme, schedules and estimate, update the programme with actual progress data monthly and shall revise the programme, schedules and estimate as required by Conditions of Contract. Copies of revised programmes etc. and notices of actual and forecast delays and shortfalls shall be regularly given to the Employer's Representative.
1.3.1.M	Computer Program: The Contractor shall provide the Employer's Representative with a copy of the computer diskette or computer drive of the Target, updated and new Target programmes, schedules and estimates.
1.3.2	***RECORDS AND MEASUREMENTS***
1.3.2.A	Labour Records: The Contractor shall provide each week a record showing the number and description of workmen employed each day on the Works including those employed by Subcontractors. The contractor shall ensure that all requirements of the Works Injuries and Benefits acts, and the Occupational Safety and Health Act are satisfied with regards to Labour.

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1.3.2.B	Equipment Records: The Contractor shall provide each week a record showing the number, type and capacity of all Contractor's Equipment, excluding hand tools, daily employed on the Works. The contractor shall ensure that all requirements of the Works Injuries and Benefits acts, and the Occupational Safety and Health Act are satisfied with regards to equipment.
1.3.2.C	Daily Works Record: The Contractor shall provide each day a record showing activities performed and locations in which work has been carried out and any other matter requested by the Employer's Representative.
1.3.2.D	Monthly Report: The Contractor shall provide monthly reports which summarise the daily and weekly reports and deliver to the Employer's Representative not later than one week following the end of each month.
1.3.2.E	Wages Books and Timesheets: :The Contractor shall keep accurate and proper wage books and time sheets showing wages paid to and time worked by workmen and, when required, produce such wage books and time sheets for inspection by the Engineer's Representative.
1.3.2.F	Climatic Conditions: The Contractor shall measure and keep an accurate daily record of and submit to the Employer's Representative at the end of each week: (a) air temperatures: maximum and minimum (b) humidity (c) rainfall: total in mm and hours.
1.3.2.G	Special Records: In the event of delays for which an extension of time for completion is sought under the provision of the Contract, or in the event of any claim for costs, the Contractor shall keep such special records of the circumstances as the Employer's Representative may require, and submit copies regularly for his inspection.
1.3.2.H	Photographs: The Contractor shall provide progress photographs taken from approved stations but not less than 20 (twenty) at monthly intervals and submit 3 prints
1.3.3	***SITE ADMINISTRATION***
1.3.2.A	Labour Records: The Contractor shall provide each week a record showing the number and description of workmen employed each day on the Works including those employed by Subcontractors. The contractor shall ensure that all requirements of the Works Injuries and Benefits acts, and the Occupational Safety and Health Act are satisfied with regards to Labour.
1.3.2.B	Equipment Records: The Contractor shall provide each week a record showing the number, type and capacity of all Contractor's Equipment, excluding hand tools, daily employed on the Works. The contractor shall ensure that all requirements of the Works Injuries and Benefits acts, and the Occupational Safety and Health Act are satisfied with regards to equipment.
1.3.2.C	Daily Works Record: The Contractor shall provide each day a record showing activities performed and locations in which work has been carried out and any other matter requested by the Employer's Representative.
1.3.2.D	Monthly Report: The Contractor shall provide monthly reports which summarise the daily and weekly reports and deliver to the Employer's Representative not later than one week following the end of each month.
1.3.2.E	Wages Books and Timesheets: :The Contractor shall keep accurate and proper wage books and time sheets showing wages paid to and time worked by workmen and, when required, produce such wage books and time sheets for inspection by the Engineer's Representative.
1.3.4	***COMPLETION***
1.3.4.A	Notice of Completion: The Contractor shall give the Engineer's Representative notice of the anticipated date of substantial completion of the whole or any part of the Works as per the conditions of contract.
1.3.4.B	Making good Defects: The Contractor shall make arrangements with the Employer and give reasonable notice of the dates for access to the various parts of the Works for the purpose of making good defects and shall inform the Engineer's Representative of the dates and when remedial works to the various parts of the Works are completed as per the conditions of contract.
1.3.5	***QUALITY PLAN***
1.4	**QUALITY STADARDS AND CONTROL**
1.4.1	***GENERALLY***
1.4.1.A	Good Practice: Where and to the extent that materials, products and workmanship are not fully specified they are to be of a standard appropriate to the Works and suitable for the purposes stated in or reasonably to be inferred from the Contract Documents, and in accordance with good building practice, including the relevant provisions of current standards, regulations etc.
1.4.2	***SETTING OUT AND ACCURACY***
1.4.2.A	Site Survey: Before commencing Work on Site, the Contractor shall carry out a topographical survey of the Site, or such parts of the Site as the Engineer may direct, in conjunction with, or as instructed by, the Engineer, to record the Site limits, dimensions, ground levels, obstructions and other features and to establish base lines and points for future setting out.

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1.4.2.B	Setting Out: shall be performed using methods and measuring instruments described in BS 5606, or as described in the Contract.
1.4.2.C	Setting Out Utility Works: shall be as shown on the Drawings or as instructed on Site. Stake-out be revised if, in the opinion of the Engineer, modification of line or grade is advisable.
1.4.2.D	Setting Out Civil Works: shall be as shown on the Drawings or as instructed on Site.
1.4.2.E	Setting Out: The Contractor shall inform the Engineer when setting out is complete and before commencing construction.
1.4.2.F	Record Drawings: The Contractor shall record details of all grid lines, existing ground levels, setting-out stations, benchmarks and profiles on the site setting-out Drawing; retain on the Site throughout the duration of the Contract and hand to the Engineer on completion.
1.4.2.G	All Dimensions and Levels: both on the Drawings and the Site shall be checked, particularly the correlation between components and the work in place.
1.4.2.H	Tolerances: The Works shall be constructed to achieve levels of accuracy within the permissible deviations of relevant standards, unless otherwise specified.
1.4.2.I	Appearance and Fit: The Works shall be constructed to higher levels of accuracy than those specified where necessary to achieve a satisfactory appearance and to ensure that materials, elements and components of the building fit together as designed. Wherever the accuracy, fit or appearance of the work is likely to be critical or difficult to achieve the Contractor shall obtain the Engineer's approval of proposals or of the partially finished work as early as possible.
1.4.2.J	Non-Compliance: Work which fails to meet the specified levels of accuracy must not be rectified without approval. Submit proposals for such rectification or removal and replacement.
1.4.3	***PRODUCTS AND MATERIALS***
1.4.3.A	Products and Materials: are to be new unless otherwise specified and are to be handled, stored and fixed with care to ensure they are not damaged when incorporated in the Works.
1.4.3.B	Selection of Products: Select products and materials in accordance with Procedure Note 4. Product Selection (included at the end of this Section).
1.4.3.C	Product Procurement: The Contractor shall submit for approval a description of products and materials, names of manufacturers and suppliers and copies of all test reports verifying conformity with the provisions of the Specifications. Products and materials shall not be ordered without the approval of the Engineer. When directed by the Engineer or otherwise specified, the Contractor shall submit product and material samples for approval.
1.4.3.D	Standards: For products and materials specified to particular standard, such as BS or ASTM, certificates of compliance are to be obtained from manufacturers when requested by the Engineer
1.4.3.E	Single Sources: Where a choice of manufacturer or source of supply is allowed for any particular product or material, the whole quantity required to complete the work must be of the same type, manufacture and source. Written evidence of sources of supply are to be provided when requested by the Engineer and sources are not to be changed without approval.
1.4.3.F	Checking Compliance of Products and Materials: The Contractor shall check all delivery tickets, labels, identification marks and where appropriate, the goods themselves to ensure that all products comply with the Specification. Where different types of any product are specified, they shall ensure that the correct type is being used in each location. In particular, the following shall be checked: (a) sources, types, qualities, finishes and colours are correct, and match any approved samples (b) accessories and fixings which should be supplied with the goods have been supplied (c) sizes and dimensions are correct (d) goods are clean, undamaged and in good condition, with intact protective coverings and unbroken seals (e) materials which have a limited shelf life are not out of date.
1.4.3.G	Storage and Protection of Products and Materials: Products and materials shall be stored and protected so as to preserve their quality and suitability for incorporation into the Works. The Contractor shall: (a) locate and arrange storage so as to facilitate inspection by the Engineer (b) prevent over-stressing and any other type of physical damage (c) keep clean and free from contamination and staining (d) keep dry and in a suitably low humidity atmosphere to prevent premature setting, moisture movement and similar defects. Where appropriate allow free air movement around and between stored components, if necessary (e) prevent excessively high or low temperatures and rapid changes of temperature in the material, if requested (f) keep different types and grades of materials separately and adequately identified (g) so far as possible, keep materials in their original wrappings, packings or containers, with unbroken seals, until immediately before they are used

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1.4.3.H	Products and Materials Supplied by Employer: The Contractor shall be responsible for the proper storage and protection of products and materials, if any, furnished by the Employer for the Contractor's use.
1.4.4	***CONTRACTORS PLANT AND EQUIPMENT***
1.4.4.A	Plant and Equipment: used in the Works shall be of appropriate size, sufficient capacity and in such good mechanical condition as to properly and adequately perform in accordance with the requirements of the Specifications and shall be available for use when required by the Engineer. Plant and Equipment provided for the works should have valid certificates of inspection by the Department of Occupation Safety and Health.
1.4.4.B	Performancce of Plant and Equipment: WHEREVER PLANT AND EQUIPMENT of a particular size or type is specified the Contractor shall furnish evidence to the Engineer that the performance and output of the plant or equipment proposed is at least equal to that of the specified type.
1.4.4.C	Provision and Use of Plant and Equipment: The Contractor shall submit together with his Tender, a complete Schedule of the numbers and types of plant and equipment which he proposes to utilise on Site to carry out the Works. The schedule shall contain full details for each item.
1.4.5	***WORKMANSHIP***
1.4.5.A	Work: is to be carried out by or under the close supervision of experienced tradesmen skilled in the particular type of work.
1.4.5.B	Manufacturer's Recommendations: Products shall be handled, stored, prepared and used in accordance with manufacturer's recommendations.
1.4.5.C	Suitability of Previous Work and Conditions: Before starting each new type or section of work the Contractor shall ensure that: (a) previous related work is appropriately complete, in accordance with the project documents, to a suitable standard and in a suitable condition to receive the new work (b) all necessary preparatory work has been carried out including provision for services (c) environmental conditions are suitable, particularly that the building is suitably weathertight when internal components, services and finishes are installed.
1.4.5.D	Defects in Existing Works: The Contractor shall report to the Engineer if any existing work is defective and obtain his instructions before proceeding with new work which may cover up the defective work or which may be adversely affected by the defective work.
1.4.5.E	Rectification of Defective Work: If any part of the work is known or is suspected to be not in accordance with the Contract, the Contractor shall submit proposals to the Engineer for opening up, inspecting, testing and rectification and carry out the Engineer's instructions in relation thereto, including, where so instructed, removal and reconstruction.
1.4.6	***PRODUCT DATA, SAMPLES AND APPROVALS***
1.4.6.A	Product Data and Samples: Where approval of products or materials is specified, the Contractor shall submit products data and samples or other evidence of suitability. Approved product and material samples are to be retained on the Site for comparison with products and materials used in the Works and, unless otherwise specified or directed, be removed when no longer required. All products and materials being used will be subject to inspection and testing, at any time prior to such incorporation, if requested.
1.4.6.B	Product Data: shall be submitted in accordance with Procedure Note 5: Submittal of Product Data (included at the end of this Section).
1.4.6.C	Samples: shall be submitted in accordance with Procedure Note 6: Submittal of Samples (included at the end of this Section).
1.4.6.D	Works Samples: Where samples of finished work are specified the Contractor shall obtain approval of stated characteristics before proceeding with the Works and shall retain approved samples on the Site for comparison with the Works. Work samples which are not part of the finished Warks shall, unless otherwise specified or directed, be removed when no longer required.
1.4.6.E	Source Tests: All source samples shall be taken by the Contractor in the presence of the Engineer, using approved sampling procedures. All source approval tests shall be performed under the supervision of the Engineer or when so specified, by an independent laboratory approved by the Engineer and engaged by and at the Contractor's own cost and expense.
1.4.6.F	Source Tests: After approval of any source of materials, the Contractor shall produce from such source only to the extent that materials produced are of substantially the same quality as the approved samples.
1.4.6.G	Source Tests: The Engineer may periodically order re-testing of previously approved sources to verify that they continue to conform to the Specifications and may order re-testing at the same or at a different laboratory from the one performing the original source approval tests. If re-testing indicates that a previously approved source no longer conforms with the Specifications, the Contractor shall forthwith cease production from such source.

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1.4.6.H	Approvals: Where and to the extent that products, materials or work are specified to be approved, or the Engineer instructs or requires that they are to be approved, the same must be supplied and executed to comply with all other requirements and, in respect of the stated or implied characteristics, either to the express approval of the Engineer, or to match a sample expressly approved by the Engineer as a standard for the purpose.
1.4.6.I	Approvals: Inspection or any other action by the Engineer must not be taken as approval of products, materials or work unless the Engineer expressly confirms in writing, in terms referring to: (a) date of inspection (b) part of the work inspected (c) respects or characteristics which are approved extent and purpose of the approval (d) any associated conditions. Approval, inspection or any other action by the Engineer shall not in any way relieve the Contractor from his responsibility for ensuring the suitability and fitness for purpose of all products, materials and work incorporated into the Works.
1.4.7	***GUARANTEES***
1.4.7.A	Gurantees: The Contractor shall comply with specific requirements for the provision of guarantees for products, work and installations that are required to be guaranteed in the Contract. In addition, he shall, unless otherwise specified: 1. ensure that all guarantees commence from the date of substantial completion of the Works as certified by the Engineer, are transferable and are assigned the Employer upon expiration of the Defects Liability Period 2. ensure that the following additional requirements are accommodated in the guarantees: a. Related Damage and Losses: when correcting failed or defective guaranteed work, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of guaranteed. b. Reinstatement of Guarantee: when failed or defective work covered by a guarantee has been corrected by replacement or rebuilding, reinstate the guarantee by written endorsement. The reinstalled guarantee period shall be equal to that of the original guarantee with an equitable adjustment for depreciation. c. Replacement Cost: upon determination that work covered by a guarantee has failed or is defective, replace or rebuild the work to an acceptable condition complying with the requirements of the Contract. The Contractor shall be responsible for the full cost of removing, replacing and rebuilding failed or defective work. 3. compile and submit written guarantees to the Employer at or prior to substantial completion in the following form: a. original copies of all required guarantees, each properly executed by the Contractor, Subcontractor, supplier or manufacturer, as applicable b. organise and arrange the guarantees in an orderly sequence according to the Specification format and bind into heavy duty, commercial quality, vinyl covered, loose leaf binders of appropriate thickness and size to accommodate contents. Identify each binder on the front and spine with the typed or printed title 'GUARANTEES' together with project title and name of Contractor. Provide table of contents, dividers and tab markers for each individual guarantee
1.4.8	***WORK AT COMPLETION***
1.4.8.A	Final Cleaning: The Contractor shall clear and clean the Site and Works prior to substantial completion using methods acceptable to the Engineer in accordance with Procedure Note 7: Final Cleaning (included at the end of this Section).
1.4.8.B	Temporary Markings: coverings and protective wrappings shall be removed unless otherwise instructed by the Engineer.
1.4.8.C	Painted Surfaces: The Contractor shall touch up minor faults in newly painted or repainted work, carefully matching colour and brushing out edges, and shall repaint badly marked areas back to suitable breaks or junctions.
1.4.8.D	Moving Parts: The Contractor shall adjust, ease and lubricate moving parts of new work as necessary to ensure easy and efficient operation, including doors, windows, drawers, ironmongery, appliances and controls.
1.4.8.E	Security at Completion: The Site and Works shall be left in a secure condition, with all accesses locked. Keys shall be labelled, scheduled and handed to the Employer.
1.4.8.F	Project Completion Procedures: Additional administrative requirements and procedural requirements for project completion are prescribed in Procedure Note 8: Project Completion (included at the end of this Section).

Clause No.	CLAUSE
1.4.9	***PRODUCT SELECTION***
	Definition: the following definitions are not intended to change the meaning of other terms used in the Contract, such as "specialties," "systems," "structure," "finishes," "accessories," and such similar terms which are self-explanatory and have well-recognised meanings in the construction industry.
	I. "Products" are items purchased for incorporation in the Work, whether purchased for the project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
1.4.9.A	a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract.
	2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
	3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wring or piping.
	General Product Requirements:: Provide products that comply with the Contract, that are undamaged and, unless otherwise indicated, unused at the time of installation:
1.4.9.B	1. Provide products complete with all necessary and associated fixings, accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
	2. Standard Products: where available, provide standard products of types that have been regularly produced and used successfully in similar situations on other projects. Product Selection Procedures: Product selection is governed by the Contract and governing regulations, not by previous project experience. Procedures governing product selection include the following:
	1. Proprietary Specification Requirements: where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted, unless otherwise indicated.
	2. Semi-Proprietary Specification Requirements: where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted, unless otherwise indicated.
	a. where products or manufacturers are specified by name, accompanied by the term "or equal" or "or other equal and approved" comply with the procedures concerning "substitutions" to obtain approval for use of an unnamed product.
	3. Non-Proprietary Specifications: when the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with procedures concerning "substitutions" to obtain approval for use of an unnamed product.
1.4.9.C	4. Descriptive Specification Requirements: where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
	5. Performance Specification Requirements: where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
	a. manufacturer's recommendations may be contained m published product literature, or by the manufacturer's certification of performance.
	6. Compliance with Standards, Codes and Regulations: where Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
	7. Visual Matching: where Specifications require matching an established Sample, the Engineers decision will be final on whether a proposed product matches satisfactorily.

Clause No.	CLAUSE
1.4.10	***PRODUCT DATA***
	Collection: product data into a single submittal for each element of construction or system. Mark each copy to show which choices and options are applicable to the project.
	1. Where product data have been printed to include information on several similar products, some of which are not required for use on the project, or are not included in this submittal, mark copies to clearly indicate which information is applicable.
	2. Where product data must be specially prepared for required products, materials or systems, because standard printed data are not suitable for use, submit as Final Design Drawings not Product Data.
1.4.10.A	3. Include the following information in product data: a. manufacturer's printed recommendations b. compliance with recognised trade association standards c. compliance with recognised testing agency standards d. application of testing agency labels and seals e. notation of dimensions verified by field measurement f. notation of co-ordination requirements.
	4. Do not submit product data until compliance with requirements of the Contract has been confirmed.
	5. Submittals: submit a number of copies, as agreed with the Employer, of each required product data submittal. The Engineer will retain one copy, and will return the other marked with the action taken and corrections or modifications required. Unless the Engineer observes non-compliance with provisions of the Contract, the submittal may serve as the final submittal
	6. do not permit use of unmarked copies of product data in connection with construction activities.
	Samples Submission: if requested by Employer's Representative, physically identical with the material or product proposed for use; submit full-size, fully fabricated samples, cured and finished in the manner specified.
	1. Mount, display, or package samples in the mann er specified to facilitate review of qualities indicated. Prepare samples to match the Engineer's sample where so indicated. Include the following information: a. generic description of the sample b. size limitations c. sample source d. product name or name of manufacturer e. compliance with recognised standards f. compliance with governing regulations g. availability h. delivery time.
1.4.10.B	2. Submit samples for review of kind, colour, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed. a. where variations in colour, pattern, texture or other characteristics are inherent mn the material or product represented by a sample, submit sets of multiple units of the sample, which show approximate limits of the variations. b. refer to Specification Sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics. c. refer to Specification Sections for samples to be returned to the Contractor for incorporation in the work. Such samples must be m an undamaged condition at time of use. On the transmittal form, indicate such special requests regarding disposition of sample submittals.
	3. Preliminary Submittals: where samples are specified for selection of colour, pattern, texture or similar characteristics from a manufacturer's range of standard choices, submit a single, full set of available choices for the material or product. a. preliminary submittals will be reviewed and returned with the Engineer's marking indicating selection and other action taken.
	4. Submittals: except for samples intended to illustrate assembly details, workmanship, fabrication techniques, connections, operation and other characteristics, submit two sets of samples unless otherwise indicated; one set will be returned by the Engineer, marked with the action taken.
1.4.11	***FINAL CLEANING***

Clause No.	CLAUSE
1.4.11.A	Summary: This Procedure Note: specifies administrative and procedural requirements for final cleaning at completion. 1. Special cleaning requirements for specific elements of the work are included in appropriate Sections of the Specifications.
1.4.11.B	Summary: General Project Completion: requirements are included in Procedure Note 8: Project Completion.
1.4.11.C	Summary: Environmetal Requirements: Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply fully with government and local environmental and anti-pollution regulations. 1. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm drains or sanitary sewer drains.
1.4.11.D	Materials: Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finish surfaces.
1.4.11.E	Final Cleaning: General: Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to an acceptable standard. Comply with manufacturer's instructions. Final Cleaning: Complete: the following cleaning operations at or prior to substantial completion and before requesting a Taking-Over Certificate in respect of any Section, part or whole of the Works, as applicable.
1.4.11.F	1. Clean the project Site and grounds in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter and foreign substances. Sweep paved areas broom clean. Remove petro-chemical spills, stains and other foreign deposits. Rake grounds that are neither planted nor paved, to a smooth even-textured surface. 2. Remove tools, construction equipment, machinery and surplus material from the Site. 3. Clean exposed exterior and interior hard surfaced finishes to a dirt• free condition, free of stains, films and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. 4. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes and similar spaces. 5. Broom clean concrete floors in unoccupied spaces. 6. Vacuum clean carpet and similar soft surfaces, removing debris and excess nap. 7. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces. 8. Remove labels that are not permanent labels. 9. Touch-up and otherwise repair and restore marred exposed finishes and surfaces. Do not paint over laboratory certified and similar labels or mechanical and electrical name plates. 10. Wipe surfaces of mechanical and electrical equipment, elevator equipment and similar equipment. Remove excess lubrication, paint and mortar droppings and other foreign substances. 11. Clean plumbing fixtures to a sanitary condition.
1.4.11.G	Final Cleaning: Removal of Protection: Remove temporary markings, coverings and protective wrapping and other protection facilities installed during construction to protect previously completed installations during the remainder of the construction period.
1.4.11.H	Final Cleaning: Compliance: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of in a lawful manner. 14. 1. Where extra materials of value remain after completion of associated construction, they become the Employer's property. Unless otherwise indicated, dispose of these materials as directed by the Engineer.

Clause No.	CLAUSE
1.4.12	***PROJECT COMPLETION***
1.4.12.A	Summary: This Procedure Note: specifies administrative and procedural requirements applying to completion of the Works as a whole and to any Phased, Sectional or partial completion where applicable,
	Summary: Completion: requirements for specific construction activities are included in the appropriate Sections of the Specification. requirements for the following are specified elsewhere: 1. Final Cleaning: refer to Procedure Note 6.
1.4.12.B	2. Submittal of Guarantees: refer to sub-section 1.4. 7. 3. Operation and maintenance manuals submittal: refer to Procedure Note 3 and Section 1.2 Documents and Drawings. 4. Project record documents submittal: refer to Procedure Note 2, and Section 1.2 Documents and Drawings.
1.5 ***1.5.1***	**EMPLOYER'S TAKING OVER** Employer's Taking Over: Notice of completion shall be submitted to the Employer not earlier than 14 days before the Works will be completed and ready for taking over.
1.5.1.C	Upon receipt of the Contractor's notification of completion, the Employer has 28 days to either proceed issuing the Taking Over Certificate or reject the application, giving reasons and specifying the remedial work required to be done by the Contractor. Taking Over Certificate procedures are further regulated in the Contract under Clause 10.1 [Taking Over of the Works and Sections], Clause 10.2 [Taking Over ofParts ofthe Works] and Clause 10.3 [Interference with Tests on Completion].
1.6 ***1.6.1***	**DEFECTS NOTIFICATION PERIOD AND PERFORMANCE CERTIFICATE** Defect Notification Period and Performance Certificate: A. Contractor shall comply with Contract conditions, Clause 11.1 [Completion of Outstanding Work and Remedying Defects], to ensure the conclusion of unfinished works within the time stated in the Taking Over Certificate and the amending of defects or damages before the expiry date of the Defect Notification Period. If a defect appears or damage occurs during the relevant Defect Notification Period, the Employer shall notify the Contractor accordingly. Specific regulations on the management of remedial works and the obligations addressed to each involved party are included in the Contract, from Clause 11.2 [Cost ofRemedying Defects] to Clause 11.8 [Contractor to Search].
1.6.1.D	The Contractor is granted the access to all works until the issuing of the Performance Certificate. B. Contractor's duties shall not be considered fulfilled until the Employer has issued the Performance Certificate, which constitutes the acceptance of the works and states the date of completion of Contractor's obligations under the Contract. The Employer shall issue the Performance Certificate to the Contractor within 28 days after the expiration of the Defects Notification Period, or as soon as the Contractor has provided the complete documentation required by Contract, as per Clause 11.9 [Performance Certificate], and completed pending works, as per Clause 11.10 [Unfulfilled Obligations]. The Contractor is responsible to clear the site of working equipment, surplus material, rubbish and remains within 28 days from the issue of the Performance Certificate, in compliance with Clause 11.11 [Clearance ofSite] of the Contract.
1.7	**TEST ON COMPLETION**

Clause No.	CLAUSE
1.7.1.E	Tests on Completion: Tests on Completion shall be carried out in accordance with Clause 9.1 and 7.4 of the Conditions of Contract, while submitting As-Built Documents and Operation and Maintenance Manuals. Procedures governing Tests on Completion are stipulated in the Contract under Clause 9.1 [Contractor's Obligations], Clause 9.2 [Delayed Tests], Clause 9.3 [Retesting] and Clause 9.4 [Failure to Pass Tests on Completion].
1.8.1	***TRAINING OF EMPLOYER'S PERSONNEL***
1.8.1.A	Training of Employer's Personnel: instruct Employer's personnel in the operation, adjustment, and maintenance of products, equipment, and systems. Provide instruction at mutually agreed upon times. Use qualified instructors thoroughly trained and experienced in the operation and maintenance of the equipment or systems involved 1. For equipment that requires seasonal operation or adjustment, provide similar instruction at appropriate seasons during the Defects Liability Period. 2. Use operation and maintenance manuals for each piece of equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance.
1.8.1.B	Operation and Maintenance Instruction: Arrange for each installer of building systems and equipment that requires operation and regular maintenance to meet with the Employer's personnel to provide instruction in proper operation, adjustment and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items: 1. Maintenance manuals. 2. Record documents. 3. Spare parts and materials, if as per Contract 4. Identification systems. 5. Control sequences. 6. Hazards. 7. Guarantees and bonds. 8. Maintenance agreements and similar continuing commitments.
1.8.1.C	Demonstrate: as part of instruction for operating equipment, the following procedures: 1. Start-up. 2. Shutdown. 3. Emergency operations. 4. Noise and vibration adjustments. 5. Safety procedures. 6. Economy and efficiency adjustments. 7. Seasonal operation and adjustments. 8. Effective energy utilization.
1.9	**SECURITY AND SAFETY OBLIGATIONS**
1.9.1	***PROTECTION OF THE WORKS***
1.9.1.A	Security: The Contractor shall take all measures necessary, including watching and lighting at night, to prevent unauthorised entry to the Site and to safeguard the Site, the Works, materials, Plant, Contractor's Equipment and Temporary Works against damage from trespass and theft.
1.9.1.B	Protection: The Contractor shall protect each section of completed work from damage by water, extreme heat and inclement weather or from damage caused by later operations and shall make good any damage to the satisfaction of the Engineer, if necessary.
1.9.1.C	Stability: The Contractor shall ensure that stability and structural integrity of the Works are maintained during construction and shall provide temporary supports where necessary and shall not overload any part of the Works with materials, Plant or Contractor's Equipment.

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1.9.1.D	Moisture: The Contractor shall prevent any part of the Works from becoming wet or damp where this may cause damage and shall provide fuel, equipment and attendance as necessary to dry out the Works in such a manner as to prevent blistering and failure of adhesion, damage due to entrapped moisture or excessive movement.
1.9.1.E	Rubbish: The Contractor shall remove rubbish and debris from the Site as it accumulates and keep the Works clean and tidy. Rubbish, dirt and debris shall be removed from voids and cavities before they are sealed.
1.9.1.F	Infestation: The Contractor shall take all necessary measures, to the approval of the Engineer, to keep the Works free from infestation by rodents, insects and the like.
1.9.2	***PROTECTION OF OTHER PROPERTY AND SERVICES***
1.9.2.A	Trees, Hedges Shrubs, Lawns: The Contractor shall protect, maintain and preserve existing trees, hedges, shrubs, lawns etc. and shall replace to approval, or treat as instructed, any plants or planted areas damaged or removed without approval.
1.9.2.B	Existing Features: The Contractor shall prevent damage to existing buildings, fences, gates, walls, roads, paved areas and other features on the Site which are to remain in position during the execution of the Works.
1.9.2.C	Existing Services: The Contractor shall: 1. notify all service authorities and private owners before commencing any work which may affect or damage existing drains and services and observe all service authorities' regulations and/or recommendations for work adjacent to existing services 2. ascertain the positions of all services not indicated in the Contract Documents and check the positions of those which are so indicated 3. adequately protect, maintain and prevent damage to all services and shall not interfere with their operation without the consent of the service authority or owner. 4. If any damage is caused to existing services as a result of execution of the Warks, the Contractor shall notify the Engineer and the service authority or private owner and make arrangements to repair the damage to the satisfaction of the service authority or private owner as appropriate.
1.9.2.D	Adjoining Services: The Contractor shall: 1. take all reasonable precautions to prevent damage to adjoining property and, if any damage is caused as a result of the execution of the Works, make good to the satisfaction of the owner. 2. obtain permission of the owners if it is necessary to erect Temporary Works or otherwise use adjoining property. 3. advise owners or occupiers of adjoining property of the dates on which work which may affect them is to be executed.
1.9.2.E	Existing Condition: of roads, paths, features, services and adjoining property which is at risk from damage shall be recorded by photographs or surveys, as appropriate and as directed by the Engineer.
1.9.2.F	Occupied Premises: The Contractor shall: 1. where works are to be carried out in or adjacent to occupied premises, ascertain the times and nature of the occupation and use. Carry out works with minimum inconvenience, nuisance and danger to the occupants and users. 2. advise the Engineer immediately, if any potential hazard or danger arises which may jeopardise the health or safety of persons in occupied premises.
1.9.3	***STATUTORY AND OTHER OBLIGATIONS***
1.9.3.A	Traffic Regulations: The Contractor shall ascertain and comply with any regulations concerning traffic and parking in addition to the obligations imposed by the Conditions of Contract and by law.
1.9.3.B	Traffic Control: The Contractor shall provide and maintain all necessary diversions, diversion signs, barricades, fencing, lighting, flagmen or stop/go signs where the Works affect the safety of traffic and the public on existing roads or temporary diversion roads.
1.9.3.C	Noise, Polution and Nuisance: The Contractor shall ascertain and comply with any regulations concerning noise, pollution and other nuisance in addition to the obligations imposed by the Conditions of Contract and by law.
1.9.3.D	Noise, Polution and Nuisance: Compressors, percussion tools and vehicles are to have effective silencers of a type recommended by the manufacturers of the equipment.

Clause No.	CLAUSE
1.9.3.E	Fire Precautions: The Contractor shall take all necessary measures to prevent personal injury or death, or damage to the Works or other property, including but not limited to provision of firefighting facilities in all vulnerable areas and as instructed by the Engineer marking escape routes and illuminating them if necessary instructing workmen in fire precautions and use of firefighting equipment displaying notices on fire safety and procedures in the event of a fire on Site.
1.9.3.F	Nuisance: The Contractor shall take necessary precautions to prevent nuisance from smoke, dust, rubbish, water, polluted effluent and other causes.
	Safety Programme: In addition to the requirements of the General Conditions and other Contract requirements, the Contractor shall submit for the Engineer's approval, within twenty-one (21) days from the start date for the Works, a proposed Safety Programme covering the following items:
	1. Designation of a Safety Supervisor to administer the Safety Programme. Establish criteria for employee clothing and protective equipment.
	2. Safety practices for all employees in all phases of construction, and requiring use of
	3. safety devices.
1.9.3.G	4. Maintenance of work in a neat, orderly, sanitary and safe condition.
	5. Provision of equipment and training of employees to minimize fire hazards, fight fires and act in emergencies.
	6. Instruction of new employees in safe working practices, monitoring of employee actions to detect unsafe practices, and holding of regular meetings to instruct and discuss safety program.
	7. Co-operate with the Employer's, the Engineer's and the Contractor's insurance companies with respect to safety matters.
	Upon the Engineer's approval of the Safety Programme the Contractor shall, for the full term of the Contract, operate the Safety Programme, maintain accurate records of safety activities and accident, and submit safety and accident reports to the Engineer on the approved forms.
1.1	**TEMPORARY WORKS AND SERVICES**
1.10.1	***GENERALLY***
1.10.1.A	Locations: The Engineer's Representative's should be informed for the intended siting of all spoil heaps, Temporary Works and services.
1.10.1.B	Standards and Details: Temporary Works are to be constructed to recognised standards and codes of practice so that they are fit for their purpose.
1.10.1.C	Temporary Works: and services are to be maintained, altered and adapted and as necessary and cleared away on completion or when no longer required. Work disturbed is to be made good.
	General: The Contractor shall provide all Temporary Works and services and Contractor's Equipment and tools required for the efficient and safe execution of the Works, including but not limited to:
	1. temporary roads, hard standings, sleeper tracks and the like temporary fences, gates and barriers
	2. temporary offices, stores, messrooms, latrines and compounds scaffold, ladders, hoists, cranes and the like
1.10.1.D	3. temporary screens, chutes, coverings, roofs and rainwater pipes for protection of the
	4. Works and personnel
	5. fixed and movable mechanical plant
	6. temporary water and power supplies and site lighting
	7. temporary drainage.
1.10.2	***TEMPORARY SITE FACILITIES***

Clause No.	CLAUSE
1.10.2.A	Nameboard: The Contractor shall provide two suitably sized project nameboards, bearing the names of the Employer and Engineer together with any corresponding logos, the name of the project, the name of the Contractor and such other names and information as the Engineer may direct. Design and style of the nameboard is to be submitted to the Engineer for approval prior to fabrication. Nameboards are to be written in English and local language and erected at suitable locations as directed by the Engineer.
1.10.3	***CONTRACTOR'S TEMPORARY FACILITIES***
1.10.3.A	Contractor's Temporary Facilites: The Contractor shall provide, furnish and equip as necessary, all temporary buildings and facilities as required for his own use; including but not limited to site offices and with appropriate sanitary facilities; workshops, sheds and stores; temporary site toilets, latrines and the like.
1.10.4	***TEMPORARY SERVICES***
1.10.4.A	Water: The Contractor shall provide clean water for the Works and make temporary arrangements for storing and distributing about the Site.
1.10.4.B	Electricity: The Contractor shall provide electric supply and all equipment for lighting and power for the Works and make temporary arrangements for distributing about the Site.
1.10.4.C	Power: The Contractor shall provide electric power for the Works, including supplies for commissioning engineering services and Plant, at the required voltages.
1.10.4.D	Lighting: The Contractor shall provide lighting for the Site and the Works for safety and security of the Works and to facilitate proper execution of work and to illuminate internal surfaces during finishing work and inspection. Spaces designed to be artificially lit during daylight hours are to have temporary illumination.
1.10.4.E	Permanent Electricity Supply and Lighting Installation: may be used for testing and commissioning and to illuminate the Works, subject to the following conditions: 1. the Employer must guarantee that it will be available 2. the Contractor must take responsibility for the operation, maintenance and supervision of the system, indemnify the Employer against all damage and pay all costs and renew all used tubes and lamps 3. the Contractor must indemnify the Employer against reduction in manufacturer's guarantee periods for equipment etc. due to its use before completion of the Works.
1.10.4.F	Telephones: The Contractor shall provide temporary telephone facilities and service for his own use and pay all connection and user charges, including the cost of all call, except for internal calls.
1.10.5	***TEMPORARY FACILITIES FOR THE ENGINEER AND/OR EMPLOYER***
1.10.5.A	General: All temporary facilities provided for the Engineer's and/or Employer's staff shall remain available until three months beyond the issuance of Taking-Over Certificate or until such earlier time as the Engineer may decide.
1.10.6	***DIVERSION OF PUBLIC UTILITY SERVICES***
1.10.6.A	Temporary Diversion of Existing Public Utility: where execution of the Works involves the temporary diversion of existing public utility services, the Contractor shall perform such temporary diversion and shall maintain the flow or service as directed by the Engineer. Unless otherwise stated the cost will be deemed to be included in the Contract Price.
1.10.6.B	Permanent Diversion of Existing Public Utility: where the Works require the permanent diversion of existing public utility services, either where shown on the Drawings or where directed by the Engineer, the diversion shall be carried out by the Contractor and shall be paid for at the prices stated for such work in the Bill of Quantities.
2	**EARTHWORKS**
2.1	**SCOPE**
2.2	**SITE CLEARANCE**
2.2.1	***CLEARANCE AND GRUBBING***
2.2.1.A	: The contractor shall remove, cart away and dispose of all vegetation, surface debris, and rocks from areas where the works are to be perfomed.
2.2.1.B	: When shown on diagrams or directed by the enginner, the contractor shall remove and dispose of pavement layers including asphalt and granular layer to the surface of the subgrade.
2.2.1.C	: Trees shall be removed carefully, stored and / or relocated as specified or as instructed by the Engineer.
2.2.2	***REMOVAL OR REALIGNMENT OF OBSTRUCTION AND UTILITIES***
2.2.2.A	: The Contractor shall remove wholly or in part, cart away and dispose of all obstructions, buildings, fences, abandoned pipelines and others, as directed by the Engineer.
2.2.2.B	: Where indicated on the Drawings, utilities are to be realigned or salvaged as directed by the Engineer.
2.3	**EXCAVATION**
2.3.1	***GENERAL***

Clause No.	CLAUSE
2.3.1.A	Earth: Earth: naturally occurring, man made or placed material that can be removed manually or by mechanical shovel, bulldozer or other mechanical equipment.
2.3.1.B	Rock: Rock: naturally occurring, man made or placed material that cannot be removed by methods used for removal of earth described in Clause A but requires the use of pneumatic tools, impact breakers or, if allowed, explosives for its removal.
2.3.1.C	Materials and Conditions: Materials and conditions: the Contractor shall assess the nature of the work and the materials to be excavated, and shall take sole responsibility for his assessment of materials and conditions.
2.3.1.D	Ground Water Level: Ground-water level is to be established at the time the various excavations are carried out.
2.3.1.E	Undefined/Unsuitable materials: All unsuitable materials defined in section 2.04.2 shall be excavated and replaced undemnecath structures, foundations, manholes and chambers with suitable soil material defined in section 2.04.2, as per approved design or directed by the Engineer.
2.3.1.F	Notifying the Engineer: Notify the Engineer when excavations have reached required subgrade, for inspection. If the Engineer determines that unsatisfactory soil is present, continue excavation and replace with replacement material as directed.
2.3.1.G	Haul, stockpile, cover and store : Haul, stockpile, cover and store the excavated black cotton clay and unsuitable material to the proposed location, to be used for creating the site perimeter berms, without intermixing and as directed by the Engineer.
2.3.1.H	Stockpile soil materials : Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
2.3.2	***TOP SOIL***
2.3.2.A	Topsoil: Topsoil: before beginning general excavations or filling, the Contractor shall excavate topsoil from required areas and keep separate from excavated subsoil.
2.3.2.B	Stockpile : The Contractor shall stockpile excavated topsoil required to carry out subsequent top-soiling operations in temporary spoil heaps on the Site as instructed.
2.3.2.C	Surplus Topsoil: Surplus Topsoil: The Contractor shall remove from the Site to a tip provided by the Contractor
2.3.3	***EXCAVATING***
	General: All excavation shall be performed to the line, grades, cross sections and sizes shown on the drawings, or/and directed by the Engineer.
2.3.3.A	Methods: The Contractor shall submit with the Tender details of proposed methods of working which may cause nuisance, damage or danger to people and/or property.
	Materials arising from excavations are to remain the property of the Employer unless instructed to be removed from the Site.
2.3.3.B	Adjacent Excavations: B.1 Underground services must be set out so that their excavations do not encroach below a line drawn at an angle from the horizontal from the nearest lower edge of building foundations. The angle shall be 45 degrees for dry stable soil or 30 degrees for wet clays or soils below water table. If this condition cannot be met obtain instructions before proceeding. B.2 Where an excavation encroaches below a line drawn at an angle from the horizontal of 45 degrees for dry stable soil or 30 degrees for wet clays or soils below water table from the nearest formation level of another higher excavation then all work within the lower excavation and backfilling thereto must be completed before the higher excavation is made.
2.3.3.C	Excavated Formations: Excavated formations are to be inspected and approved before new work is laid on them. The Contractor shall give 24 hours written notice of when excavations will be ready for inspection. If, after inspection, surfaces become unsuitable due to water, frost or other causes, excavate further and backfill with approved material all at the Contractor's expense. The Contractor shall place concrete or other fill as soon as possible after inspection.
2.3.3.D	BoE Levels: The bottom of excavation shall be removed by hand just prior to placing concrete blinding or pipe laying as specified in the drawings.
2.3.3.E	Leveling: The Contractor shall level or grade and compact bottoms of excavations to Engineer's approval.
2.3.3.F	Headings: The Contractor shall drive accurately to required line and gradient and provide adequate support. Construct in approved lengths to size required to contain permanent work. The Contractor shall obtain approval from the Engineer before commencing activities.

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	Earthworks Support: G.1 Sides of Excavations: Responsibility for upholding sides of excavations rests with the Contractor.
	G.2 Sides of Excavations:Responsibility for upholding sides of excavations rests with the Contractor.
2.3.3.G	G.3 Earthwork Support: The Contractor shall use as necessary to support sides of excavations and remove on completion unless otherwise instructed. In the event of any collapse occurring while excavations are open, re-cxcavate and reinstate such excavations and other work affected at the Contractor's cxpense.
	G.4 Special Support:The Contractor shall use as necessary to uphold excavations against sides of adjoining buildings, public footpaths, roads and the like and remove on completion unless otherwise instructed.
	G.5 Unstable Ground: The Contractor shall inform the Engineer without delay if any newly excavated face will not remain unsupported sufficiently long to allow the necessary earthwork support to be inserted. If the instability is likely to affect adjacent structures or roadways take appropriate emergency action. Responsibility for preventing instability rests with the Contractor.
2.3.3.H	Waterways: Temporary diversion if necessary of ditches, field drains and other waterways encountered during the excavations is to include reinstatement on completion. If reinstatement is not possible the Contractor shall obtain instructions.
2.3.3.I	Existing Water Courses: Existing watercourses which have been diverted and are to be filled must be cleared of all vegetable growth and soft deposits before filling.
2.3.3.J	Existing Foundations: J.1 Where old foundations, beds, drains etc. are encountered the Contractor shall obtain instructions before proceeding.
	J.2 Breaking out old foundations, beds, drains etc. is to include sealing off drain ends, removing contaminated earth and disinfecting as necessary.
2.3.3.K	Backfilling: Backfilling of excavations shall be as specified in other Sections
2.3.3.L	Unauthorised Excavations: The Contractor shall backfill and compact as instructed at no expense to the Employer.
2.3.3.M	Water: All excavations shall be kept free from water arising from any source at all times. The discharge of any water from the excavations must not effect other parts of the works or adjoining areas.
2.3.3.N	Pumping: The Contractor shall not disturb material in and around excavations by pumping operations.
2.3.3.O	Sumps: The Contractor shall obtain approval of location of any sumps and fill with approved material when no longer required.
2.3.3.P	Permanent drainage system: Permanent drainage system is not to be used for disposal of water from excavations without approval.
2.3.3.Q	Drainage of Structures: The Contractor shall keep all excavations adequately drained at all times. Damage to any part of the work due to poor drainage facilities shall be repaired at the Contractor's expense.
2.3.3.R	Excavates Slopes: All excavated slopes shall be cut to the slopes shown on the Drawings.
2.3.4	***DISPOSAL OF MATERIALS***
2.3.4.A	Wastage of Materials: No excavated material shall be wasted without written permission from the Engineer. Suitable material from excavation shall be used for embankment construction or backfill, as directed by the Engineer.
2.3.4.B	Surplus Subsoil: The Contractor shall remove from the Site surplus excavated materials not specified as to be spread and levelled or stockpiled to a tip provided by the Contractor.
2.3.4.C	Tip: The Contractor shall use only authorized tips for disposal of surplus excavated material removed from the Site and pay all tip fees.
2.3.5	***ROAD EXCAVATION***
	Scope: A1. These Works shall consist of excavating material in cut sections of the road, including water courses, ditches and valley relocations (but excluding borrow pits and structural excavation) all as and where shown on the Drawings, and hauling the excavated material either to locations for road embankments or to stockpiles or to waste.
2.3.5.A	A2. These Works shall also include any necessary excavations outside the ROW ordered by the Engineer to safeguard and protect the Works. These may include diversion of existing water courses, channels; excavation of materials obstructing or impairing the flow along stream channels; and excavation of unstable materials which may slide or encroach into ditches or onto the ROW. Disposal of all such excavated materials shall be as instructed by the Engineer.

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2.3.5.B	Classification of Road Excavation: B.1 Road Excavation shall be considered as "Unclassified Excavation" which includes all materials encountered of any nature including silts, clays, sand, gravel, granular materials, all cohesive and fractured, jointed cohesion less materials and/or massive and unsuitable material. B.2 Any information concerning properties of the soil which may be shown on the plans, in the Bill of Quantities, in supplementary reports, or as a result of discussion with the Engineer or others shall be considered as gratis and shall not be a basis for the Contractor's determination of his bid prices.
2.3.5.C	Utilization of Excavated Materials: C.1 All materials removed from the excavation shall be used in the formation of the embankment, subgrade, shoulder, and at such other places as directed, unless it is declared unsuitable and ordered to be wasted by the Engineer. C.2 Unsuitable material shall include: - Unstable materials incapable of being compacted to the specified density using ordinary compaction methods at optimum moisture content for the equipment being used for compaction. - Material too wet to be compacted and circumstance prevents suitable in-place drying prior to incorporation into the work. - Materials which are otherwise unsuitable for use in or under the embankment. C.3 No excavation material shall be wasted without written permission from the Engineer. C.4 Excavated rock which is not immediately suitable for incorporation in the works can either be broken down to acceptable sizes or wasted at Contractor's expense. If such material is wasted or used in concrete or any other works, the Contractor will replace it by borrow excavation for embankment at no extra cost to the Employer. C.5 Materials such as existing concrete, bituminous or other surfaces or other materials shall, if shown on the Drawings, be stockpiled for a specific purpose or for future use. Such materials shall be excavated and handled in a manner that will exclude foreign or undesirable material. Stockpiles shall be neatly formed and maintained in an approved manner. Stockpiles shall be formed for a maximum of 3000 m* and shaped adequately according to the space available.
2.3.5.D	Drainage of Excavation Areas: D.1 During construction, surfaces in excavation areas shall be adequately drained at all times. Side ditches or gutters emptying from cut to embankment shall be so constructed as to avoid damage to embankments by erosion. D.2 Damage to the Works attributable to saturation or erosion through failure to provide adequate drainage shall be repaired by the Contractor at his expense. D.3 Whenever groundwater is encountered which may adversely affect construction, the Contractor shall advise the Engineer who will evaluate the situation and order necessary remedial measures.
2.3.5.E	Slopes, Subgrade and Ditches: E.1 All excavated slopes, subgrade and ditches shall be finished true to lines, grades and cross sections as shown on the Drawings. E.2 Slopes, except in massive rock or other material which require special treatment, shall be trimmed to slopes not steeper than the specified slope angle and rounded at top and bottom to a smooth profile to blend in with the adjacent terrain. Material shall not be loosened beyond the specified slope lines. High cut areas shall continuously be monitored by an engineering geologist or a geotechnical Engineer. E.3 In cuts where earth overlays a rock formation, slopes shall be benched in an approved manner. E.4 Ditches of all types shall be excavated and trimmed neatly in conformity with the specified grades and cross sections. All projecting rock, stumps, roots or similar shall be removed. Ditches include side ditches, furrow ditches, irrigation ditches, valley relocations, etc. E.5 The Engineer will periodically check all or any part of the Works, to determine conformance to the correct lines, grades and elevations. Tolerances on finished subgrade elevations and on elevations of the surface at the underside of the subgrade layer, shall be as specified in Section 2.05 - "Subgrade Construction".

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2.3.5.F	Excavation of Unsuitable Material: F.1 Where excavation to finished grades and cross sections exposes unsuitable material in the subgrade, slopes or ditch inverts, etc the Engincer may require the Contractor to remove the unsuitable material and backfill the excavated areas using approved material. The Contractor shall conduct his operations in such a way that necessary cross section measurements are taken before such backfill is placed. F.2 Unsuitable material shall be stored at the proposed locations, to be used for creating the site perimeter berms. F.3 The Contractor shall schedule the excavation so that cross sections are taken before and after material has been removed. F.4 Unsuitable materials outside the ROW or ditch slopes which, in the opinion of the Engineer, are potentially unstable and liable to slide or encroach into the ROW or into the ditches, shall be excavated and stored as specified for unsuitable material, unless otherwise directed by the Engineer. F.5 Unsuitable and surplus materials disposed of elsewhere than within the ROW shall be spread, levelled and shaped as directed so as to present a neat and tidy appearance. No materials shall be disposed of in such a way as to adversely affect natural drainage courses or to cause damage to the highway or adjacent public or private property F.6 If approved by the Employer, Government land can be used for disposal to the maximum extent practicable. If private land is used for disposal, the Contractor shall secure the consent of the landowner or tenant and, if necessary, and at his expense, pay for the use of such land. The use of cropland for disposal purposes will not be permitted.
2.3.6	***EXCAVATION FOR STRUCTURES***
2.3.6.A	Scope: A.1 These Works shall consist of all excavation in any material for structures associated with networks such as water tanks, pump houses, culverts, drains, manholes, utility ducts and water underdrains; for retaining walls of all types; and for other major and minor structures; and including all necessary clearing and grubbing; bailing; drainage; pumping; sheeting; temporary shoring and cribbing; construction of temporary cofferdams or cribs; and disposal of all excavated material and backfilling with suitable approved material; all as and where shown on the Drawings. A.2 These Works shall also include the removal of those portions of existing structures below ground which would in any way obstruct or interfere with construction of new structures. A.3 The Contractor will be deemed to have satisfied himself, at the time of tendering, as to the type and nature of soils and rock that will be encountered in structural excavations. A.4 All unsuitable materials defined in section 2.04.2 shall be excavated and replaced underneath structures with replacement soil materials defined in section 2.04.2, and/or as directed by the Engineer.

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2.3.6.B	Excavation: B.1 The Contractor shall notify the Engineer a sufficient time in advance of the beginning of any excavation for structures so that the Engineer may, where necessary, survey and record the cross sectional elevations and measurements of the existing ground and existing structures affected by the proposed structure. Any materials removed or excavated before these measurements have been taken and approved by the Engineer will not be paid for. The Contractor shall be solely responsible for the safety at all times of all foundation and trench excavations whether supported or otherwise. Approval of the Contractor's support system or omission of a support system for any excavations shall not absolve the Contractor from his sole responsibility in this regard. The Contractor shall take all necessary precautions, including shoring or otherwise, to protect employees in the excavation and on the ground above. The Engineer will not enter excavated areas to approve the foundation and further Works until he deems the areas to be safe. In areas where the excavation is adjacent to public roads and walkways, the Contractor shall erect all necessary barricades, barriers, enclosed walkways, and warning signs necessary to restrict the exposure of the public to the excavation. The sides of all foundation pits and trenches shallower than 1.5m shall be vertical and adequately supported at all times unless otherwise shown on theDrawings. Sides more than 1.5 m in depth shall be sloped at a stable slope or supported in an approved manner unless the material through which the pit or trench is cut is deemed to be sufficiently self-supporting and not requiring support. Open Pits and trenches shall be kept free from water. The Contractor shall minimize, to the maximum extent practicable, the length of time excavated areas are open. The Contractor will be held responsible for damage due to weather, equipment, and other causes during periods when the excavations are left open. The Contractor shall schedule the Works so that no excavation is left in an exposed condition for a period greater than 20 days unless otherwise approved. In areas where the excavation is adjacent to public highways, roads and walkways, no excavation shall be scheduled to be left in an exposed condition for more than 7 days unless otherwise approved. For excavation in material sensitive to moisture (stiff clays, marls, etc.) the excavation shall be cleaned and concrete blinding layer cast immediately on completion of the excavation. 0 The Contractor must notify the Engineer of any sign of failure or cracks within or around the excavation immediately when such signs are noticed.
2.3.6.C	Temporary Support System: C.1 When a temporary support system is required to protect adjacent property or to protect the public during construction, the Contractor's design for such support system shall be submitted for approval prior to commencing its construction. C.2 All temporary support systems shall be designed with adequate factors of safety to serve with minimal maintenance, for the duration of its intended use, and shall include adequate safety provisions to protect the public from construction activities. C.3 Not withstanding any approval of temporary support systems, the Contractor shall be solely responsible for the adequacy of their design, construction, maintenance and all necessary safety precautions associated therewith.

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2.3.6.D	Excavation for Major Structures: D.1 The foundations for buildings, water tanks, pump houses and other major structures, shall be excavated in accordance with the dimensions as shown on the Drawings and shall be of sufficient size to permit the placing of the full width and lengths of the footings. D.2 The excavation shall be carried to the elevations shown on the Drawings or as established by the Engineer. Borings and soil tests, made during design, and actual investigation of the completed foundation excavation shall be utilized by the Engineer to determine final depth. No concrete shall be placed prior to approval of the excavation pit. D.3 Unless shown otherwise on the Drawings, the bottom of all excavations shall be covered with a 100 mm minimum depth of non-structural lean (blinding) concrete having a minimum dosage of CEM 1 42.5 of 200 kg/m'to serve as a working platform. D.4 Foundation pits or trenches shall be of sufficient size and provide minimum sufficient working space to permit construction of structures or structure footings of the full width and length shown on the Drawings. D.5 Where footings are to be constructed using formwork, the excavations shall generally not extend more than 500 mm beyond the maximum dimension on each side of the proposed footing unless additional working space is clearly required and approved, by the Engineer. Any unauthorised overwidth of excavation beyond the lateral limits shown on the drawings or approved by the Engineer shall be backfilled with selected fill or lean concrete as directed by the Engineer. D.6 Where footings are to be located, in or adjacent to firm, original ground and where formwork is not required or ordered, any unauthorized overdepth excavation below the approved elevation of base of footing shall be backfilled with blinding concrete. D.7 Where excavation to rock foundation is required, the excavation shall proceed in such a manner as to allow the solid rock to be exposed and prepared in horizontal beds or properly serrated for receiving the concrete. All loose and disintegrated rock and thin strata shall be removed. D.8 When unstable material or other unsuitable material is encountered below foundation elevation, the Contractor shall excavate such material and replace it with suitable backfill material or concrete as directed by the Engineer. D.9 If temporary works are required for maintaining the excavation dry, the Contractor shall be responsible for the design and execution of the works. The proposed design shall be submitted to the Engineer for approval, however, such approval does not relieve the Contractor for his sole responsibility in this regard.
2.3.7	***EXCAVATION FOR PIPE TRENCHES***
2.3.7.A	Suitable Material: During excavation, material suitable for backfilling (Section 2.04) shall be piled at sufficient distance from the sides of the trench as to avoid overloading and prevent cave in. All excavated material not required, or unsuitable for backfilling shall be removed and carted away to an approved dumping area.
2.3.7.B	Excavation Depth: Trenches shall be excavated to such depths as will permit the pipes to be laid at elevations, slopes or depths of cover indicated on the drawings, and at uniform slopes between indicated elevations.
2.3.7.C	Excavation Widths: Trenches shall be excavated with vertical sides between the elevation of the bottom of the trench and an elevation 300 mm above the top of the pipe.
2.3.7.D	Excavation Widths: Unless otherwise indicated on the Drawings, trench widths up to 300 mm above the crown of pipe, shall not exceed the following: — For Pipes Not Exceeding 65 mm Diameter: 300 mm — For Pipes Over 65 mm and Not Exceeding 500 mm Diameter: Nominal diameter + 600 mm — For Pipes Over 500 mm and Not Exceeding 1000 mm Diameter: Nominal diameter + 1000 mm. — For Pipes Exceeding 1000 mm Diameter: Nominal diameter + 1200 mm
2.3.7.E	Excavation Widths: Where the above specified trench widths are exceeded; the Contractor shall bear the cost of increased pipe strength or additional pipe protection if the Engineer calls for such measures due to excavations being taken wider than specified.
2.3.7.F	Excavation with battered sides : Excavation with battered sides shall not intrude into private property and shall respect the statutory regulations relevant to the R.O.W. and property limits.
2.3.7.G	Excavation: When the pipe, culvert or duct are to be laid in embankments or other fill areas, the embankment or fill area shall first be filled and compacted as specified to the proposed finished grade or to a height of at least 300 mm above the crown of pipe whichever is lower. The trench shall then be excavated as in undisturbed material.
2.3.7.H	Under Existing Pavemements: When pipes, culverts or ducts are to be laid under existing pavements, trenches shall be excavated carefully and to minimum widths. Methods that will give straight and vertical face shall be used. The pavement shall be kept at its original level and condition.
2.3.7.I	: In combined trenches where one pipe is at a lower level than an adjacent pipe the following shall be applied: ~ The depth of the trench shall be as per design;— The lower pipe shall be backfilled with thoroughly compacted granular material up to a level of 0.30 meters above the higher pipe.

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2.3.7.J	: Excavation for the forming of the trench for beds shall be carried out immediately before laying beds or pipes. Unstable material, rock projections, boulders and hard spots shall be removed and replaced with approved well consolidated filling material, that will be compacted as instructed. Local soft spots shall be hardened by tamping in bedding material.
2.3.7.K	: Open trenches shall be kept free from water. The Contractor shall minimize, to the maximum extent practicable, the length of time excavated areas are open. The Contractor shall be held responsible for damage due to weather, equipment, and other causes during periods when the excavations are left open
2.3.7.L	: The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Any material or block that may cause point bearing shall be removed.
2.3.7.M	: The Contractor shall report to the Engineer any unsuitable or weak ground material that may found below the indicated excavation levels before exccuting any trimming of the excavation, pipe laying, concreting, or other work. Where, in the judgment of the Engineer the bottom of the trench is found unsuitable, such material shall be removed to the width and depth ordered by the Engineer. The trench shall then be made up by backfilling with approved material as specified herein after.
2.3.7.N	: where rock excavation is encountered, the trench shall be excavated to 150 mm below bed level and replaced with granular material or concrete having a minimum dosage of CEM I 42.5 of 200 kg/m?, as directed.
2.3.7.O	: Headings, when required, shall be accurately driven to required line and gradient and adequate support shall be provided. Construction shall be carried out in approved lengths and to size required to contain permanent work. Approval shall be obtained before starting pipe laying or other work.
2.4	**SOIL FILLING AND BACKFILLING FOR STRUCTURES**
2.4.1	***SCOPE***
2.4.1.A	Scope: This section covers general soil filling material and source, backfilling for structures, embankment construction, backfilling for pipe trenches and all particular requirements related to these works.
2.4.2	***FILLING MATERIAL AND BORROW MATERIAL***
2.4.2.A	Fill material General: Filling material shall be approved and capable of being compacted as specified.
2.4.2.B	Unsuitable Material: Unsuitable materials include material containing more than 5% by weight of organic matter, material with swell more than 3% (such as Black Cotton Clay) and clay with plasticity index exceeding 50. Unsuitable soils cannot be used for general backfilling.
2.4.2.C	Replacement soil Material: Replacement soil material shall be used in partial replacement of the excavated unsuitable materials and Black Cotton Clay. The material shall comply with the requirements of satisfactory soils, having classification groups GW, GP, GM, SW, SP, and SM or A1, A2, A3 and A4 according to AASHTO MI45 classification; and in accordance with the requirements of Fill material included in the Road Design Manual-Part I11 “Material and Pavement design for New Roads” of the Republic of Kenya, frec of rock or gravel larger than 200 mm in any dimension, debris, waste, vegetation, and other deleterious matter. The replacement material shall have a 4-day soaked CBR of at least 15% when tested in accordance with BS 1377-4.General filling material shall pass the 200 mm standard sieve and the sand material passing 0.425mm standard sieve is to have a maximum plasticity index of 20%. No piece is to have its largest dimension greater than one-third the thickness of a compacted layer. The general filling material shall have a 4-day soaked CBR of at least 15% when tested in accordance with BS 1377-4.
2.4.2.D	Backfilling material for roads: Backfilling materials for roadworks shall have no piece with its largest dimension greater than 200mm and passs a 75Smm standard sieve. The material passing 0.425mm standard sieve shall have a maximum plasticity index of 20%. General filling material shall have no piece to have its largest dimension greater than 200mm.
2.4.2.E	Sampling: The Contractor shall submit 50 kg representative samples to an approved laboratory for tests as follows and submit results for approval for Soils with Less than 50% Fines: Sieve analysis and compaction.
2.4.2.F	Approval: Sources and types of materials and moisture contents at which they may be placed and compacted are to be those approved after receipt of laboratory test results.
2.4.2.G	Borrowing of Material: If suitable filling or backfill material is not available from material excavated on the project site, the Contractor shall be responsible for locating suitable borrow and arranging for the excavation of suitable material with the land owner.
2.4.2.H	Handling Material: Borrow pits are to be excavated in a uniform manner, neatly trimmed and graded and left in an approved condition.
2.4.2.I	Borrow material requirements: The borrow material shall fulfil the requirements specified for the intended use. No borrow material shall be brought to the site unless it has been approved by the Engineer.

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2.4.2.J	Testing Fill From Borrow Pits: Testing Fill from Borrow Pits: The Contractor shall sample and test in accordance with BS1377 to determine the optimum amount of water to be used with fill material to obtain maximum dry density. Tests are to be conducted for every borrow pit and for every type of fill material encountered.
2.4.2.K	Periodic Testing: The Engineer will periodically require testing of borrow materials to verify that no change in quality has occurred since the original approval.
2.4.2.L	Field Density Test: Field density tests on compacted soils are to be made as per frequency below indicated in accordance with BS 1377-9 'Sand-Replacement Method' : One test each 2000 sq.m in embankment layers; One test each 1000 sq. m in subgrade layers.
2.4.2.M	Compaction Requirements: Compaction requirements: — For top 200 mm subgrade layer directly under roads and parking areas: — 100% of maximum dry density — For Backfill Under Roads, Parking Areas and Paved Areas within the first 300 mm depth under subgrade layer: 98% of maximum dry density. — For Backfill Deeper than 300 mm Under Same Areas as last Described: 95% of maximum dry density
2.4.2.N	Selected Fill: Excavated material conforming to the specification for Filling material and Borrow material, Clause B above.
2.4.2.O	Mixing of Materials: Stockpile fill, borrow and replacement materials without intermixing, as directed by the Engineer. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
2.4.2.P	Stockpiling of materials: Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
2.4.3	***BACKFILLING FOR STRUCTURES***
2.4.3.A	General Requirements: A.1 The Contractor shall obtain approval for his proposed method and rate of placing of backfill, before backfilling commences. A.2 Backfill materials shall be uniformly graded granular material, capable of being compacted to the specified compaction level Backfilling material shall also conform to the following: - Granular materials of the group A-1, A-2 and A-3; - Passing 100% to sieve 75 mm; - Passing less than 35% to sieve 0.075 mm; - Plasticity Index < 20; A.3 Backfill material shall not be placed against any structure until approval is given. Unless otherwise shown on the Drawings. Structures shall be backfilled to the same requirements as specified for the adjacent embankment. A.4 Backfill shall be placed in level layers for the full width of the excavated area until the elevation of the original ground or surrounding embankment is reached. Backfill next to walls, between columns or in other confined areas, shall be compacted by approved hand or portable equipment. A.5 Each successive layer of backfill shall contain only sufficient material to ensure the proper compaction indicated in the subsection C, and in no case shall any layer be greater than 250 mm thickness (before compaction). The moisture content of the backfill material shall be uniform and within the moisture range designated. A.6 Jetting of fills or other hydraulic methods involving or likely to involve liquid or semi-liquid pressure will not be permitted. A.7 Water shall be drained from the areas to be backfilled wherever practicable. In cases where, in the opinion of the Engineer, it is not practicable to drain the areas to be backfilled, the initial backfill material shall consist of crushed, open graded material conforming to the following gradation: Such material may be deposited below the standing water level without compaction. Above the water level normal laying and compaction will be used. A.8 Additional water to be added during placement of backfill material to achieve required compaction shall be fresh water or brackish water approved by the Engineer. A.9 Minimum tests required during backfilling operations to verify material are: — One Proctor test for each structure (or for each 1000 m2). — One Gradation of Materials when a material has changed. — One Plasticity Index and field density for 50% of the layers and for each footing and abutment (or for each 500 m2) as per instruction of the Engineer.

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2.4.3.B	Workmanship: B.1 Unsuitable Materials: The Contractor shall remove from the Site imported filling materials deemed unsuitable by the Engineer. B.2 Surplus: The Contractor shall remove surplus imported filling materials from the Site. B.3 The Contractor shall place filling using approved methods to required dimensions, levels, lines and profiles and to permit water to drain freely. B.4 Earthmoving Equipment: The Contractor shall not use earthmoving equipment for compaction except where approved. B.5 Heavy Steel or Pnecumatic Rollers: Special precautions shall be taken to safeguard existing structures when steel or pneumatic rollers are used. These shall not be used when compacting backfill to pipe trenches. B.6 Compaction Equipment: Backfilling shall be compacted by approved compaction equipment suited to the type of material. Compaction around foundation walls, culverts and small restricted areas shall be carried out by mechanical vibratory plates, tampers or hydraulic compactors. B.7 Moisture Content: Each layer of filling shall be moistened or dried to reach the correct moisture content for the required dry density. The Contractor shall spread and compact each layer to at least 95% of maximum dry density (last layer shall be compacted to 98%), unless otherwise specified, all as determined by BS 1377-4. 30% of the layers (or for cach 500 m2) shall be tested and approved prior to placing subsequent, as per instruction of the Engineer.
2.4.3.C	Placing and Compacting Fill: C.1 Structures shall not be subject to the pressures of backfilling or to live loads until the 28-day strength of the concrete has been reached, unless a shorter period is approved in special circumstances where the load is sufficiently small as not to constitute a risk of any damage to the structure in the opinion of the Engineer. C.2 Surfaces to receive filling shall be cleared and all vegetation removed off Site before filling is placed. Soil surfaces are to be scarified and recompacted to at least 100% of maximum dry density as determined by BS 1377-4. Compaction shall be to a depth of at least 200 mm below ground surface. Hard or smooth surfaces shall be roughened before filling is placed. Existing road surfaces and the like shall be broken up and removed or used as part of fill. C.3 Soil filling generally shall be selected fill spread and leveled in 200 mm maximum layers each well consolidated with a suitable mechanical rammer. C.4 The Contractor shall deposit soil filling in a manner not to endanger the partly finished structure or sub-structure either by direct pressure or indirectly by overloading banks contiguous to the operation or in any other manner. C.5 Minor up filling and local adjustment of levels shall be selected fill spread and leveled in 150 mm maximum layers each well consolidated by suitable mechanical means. C.6 Benching: Where difference in level between adjacent areas of filling exceeds 600 mm the Contractor shall cut into edge of higher filling to form benches having a minimum width of 600 mm and a height equivalent to the depth of a layer of compacted filling. C.7 Benching: The Contractor shall spread and compact new filling to ensure maximum continuity with previous filling.
2.4.4	***EMBANKMENT CONSTRUCTION***
2.4.4.A	: These works consist of constructing the road embankments, including preparation of the areas upon which they are to be placed; placing and compacting approved material within areas where unsuitable material has been removed; and placing and compacting approved embankment material in holes, pits and other depressions within the right-of-way area, all in accordance with the lines, grades and cross sections shown on the Drawings. A schematic section for Embankment Requirements is displayed here below:
2.4.5	***PIPE BEDDING MATERIAL AND BACKFILLING FOR PIPE TRENCHES***

Clause No.	CLAUSE
2.4.5.A	Granular Bedding and Backfill Material: A.1 Granular material for pipe bedding shall be composed of 14 mm maximum size natural gravel, crushed gravel or crushed rock, free from dirt, clay, roots, organics and other deleterious material mixed with sufficient sand to fill the voids, about 30 to 35% by volume. Granular bedding shall conform to the following: A.3 Sand bedding and fill up to 300 mm minimum above crown of the pipe shall be non-plastic, natural well graded sand having hard, strong, durable angular particles. It shall be clean and free from extraneous materials, clay balls, organic matter or other detrimental material. The amount of fines passing sieve No. 200 shall not exceed 15% A.4 Backfill over a pipe shall consists of two different materials: Initial or selected backfill and main backfill A.5 Backfill in contact with the pipes and up to 300 mm minimum above crown of the pipe shall be selected material A.6 Selected fill material shall comply with group type GW, GP, GM, BC, SW, SP, SM, SL according to AASHTO classification or equivalent. A.7 Selected fill material shall not contain ashes, cinder, refuse, rubbish, organic material, or the like. The material shall be capable of being compacted without the use of heavy rammers. A.8 The main backfill (for the remainder of the trench) shall be done with suitable material cither from material removed in the course of excavating the trench, or imported from approved borrow pit. In either case the backfill material shall conform to paragraph B of section 2.04.2 herein before.
2.4.5.B	Workmanship: Backfiling: B.1 Trenches shall not be backfilled at joints until after that section of the pipeline has successfully passed the specified tests required B.2 Sand bedding shall be placed and well compacted in layers not exceeding 150mm thick unless agreed otherwise by the engineer, moisture content should be the optimum moisture content + 2% and should achieve a minimum relative compaction of 95%. B.3 Selected material or surround up to a level of 300 mm above top of the pipe, shall be placed and compacted cither manually or with light compacting machinery so as not to endanger the pipe. Where sand bedding is used, and unless agreed otherwise by the engineer, moisture content should be the optimum moisture content + 2% and should achieve a minimum relative compaction of 90%, or 95% where the pipe is laid under existing and planned roads. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. B.4 For GRP pipe initial backfill shall be compacted to 70% relative density or as recommended by manufacturers. B.5 Main backfill shall be placed and well compacted in layers not exceeding 250 mm thick before compaction. Heavy compactors shall not be used until there is 600 mm cover over pipes. B.6 Compaction of each layer shall be according to Section 2.04.2 paragraph L herein before. B.7 Heavy steel or pneumatic rollers shall not be used for compacting backfill to pipe trenches. Special precautions shall be taken to safeguard existing structures when steel or pneumatic rollers are used. B.8 Compaction equipment shall be suited to the type of material and shall be subject to approval. Compaction around foundation walls, culverts and small restricted areas shall be carried out by mechanical vibratory plates, tampers or hydraulic compactors. B.9 Backfilling trenches for pipes with concrete beds and or surrounds shall not start before 24 hours after placing the concrete. Heavy compactors shall not be used and traffic shall not be allowed before the elapse of 72 hours after placing the concrete. B.10 When the material is too wet from rain or excessive application of water, no compaction shall be done. In this case the work shall be suspended until the previously placed and new materials have dried sufficiently to permit proper compaction. Other measures shall be taken if necessary to obtain proper compaction. B.11 Temporary crossing are to be provided over trenches to prevent construction traffic damaging pipes after backfilling. B.12 The top 500 mm of pipe trenches below road pavement layers shall be filled with crushed aggregate base course material compacted to 95% of maximum dry density. B.13 If authorized by the Engineer, the main backfill may be consolidated using water- jetting, puddling, or tamping as directed.

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2.4.5.C	Restoration of Surfaces: C.1 Restoration of asphalt, concrete, gravel pavements and the likes shall be of materials and thickness to match the existing pavement. Materials and workmanship shall be in accordance with local authority requirements and as directed by the Engineer. C.2 Restoration of pavement shall be done according to the existing pavement quality and level to ensure that new pavement is matching to provide uniform surface with the existing profile. C.3 Grassed areas shall be restored by spreading, after backfilling, approved fertile soil over affected area. Seeding, fertilizers and water shall be applied until grass is restored to its former condition. C.4 Surface grading shall be carried out to restore all un-surfaced areas and any adjoining areas disturbed to provide a level, smooth surface. C.5 The Contractor shall proceed with restoration of surfaces as soon after completion of other work as is practicable, but in no case more than 10 days after backfilling of trenches and other excavated areas. Restoration shall be completed within 20 days from the start of restoration.
4	**WET UTILITIES**
4.1	**SCOPE**
4.2	**GENERAL REQUIREMENTS**
4.2.1	***GENERAL***
4.2.1.A	Scope: A.1 This section outlines the sequence of construction works, aspects related to the right of way (ROW) and the general requirements for supply and handling of equipment and materials.
4.2.2	***SEQUENCE OF CONSTRUCTION***
	: The Contractor shall adhere to the sequence of construction as per method of statement approved by the Engineer.
	- Prepare and submit for approval composite Shop Drawings for all utilities showing alignment, ground elevation, trench invert elevation, pipe size, class and length, station and size of fittings, valves as applicable manholes, inlets, appurtenances and structures to be demolished and reinstated (curb stone, rails, culverts, etc.). Cross sections showing location and inverts of existing pipes and those proposed shall be prepared. Pipes, structures and other utilities to be removed or relocated shall be indicated on the Shop Drawings. The Contract Drawings shall be modified wherever required to produce the Shop Drawings.
4.2.2.A	- Relocate, demolish and reinstate existing utilities interfering with pipeline alignments. - Remove pavement layers, excavate trenches, and place bedding all as required. - Lay and join pipes, fittings, appurtenances, manholes, etc… - Place primary backfill material. - Perform required testing. - Carry out house connections and or connections to curb/gutter inlets as required. - Place final backfill. - Restore or reinstate surfaces and structures as required. - Carry out final surface works, road surfacing, curb stone, backing walls, sidewalk tiling, etc… - Dispose of surplus materials.
4.2.3	***RIGHT OF WAY (ROW)***
4.2.3.A	Extent: A.1 All utilities services shall be installed in the right-of-way of existing or proposed roads as shown on the Drawings according to typical cross sections.
4.2.3.B	Clearing and Grading: B.1 The ROW shall be used for both access to works sites and for service roads for the pipelines. B.2 The ROW shall be cleared of all vegetation and graded to the required slopes; road cross-sections and all drains shall be as indicated on the Drawings. B.3 Where the works coincide with roadworks, road surfacing works shall commence only after completion of pipe installation and construction of all required works.
4.2.4	***MATERIALS, PRODUCTS SUPPLY AND HANDLING***
4.2.4.A	Structural Materials: A.1 Concrete shall conform to the requirements specified in Section 5.1 “Concrete and Concrete Mixes and Testing" of Detail Design Report Specifications – Volume 5 Concrete and Steel Works. A.2 Reinforcement shall conform to the requirements specified in Section 5.3 "Steel Reinforcement and Fixing" of Detail Design Report Specifications – Volume 5 Concrete and Steel Works

Clause No.	CLAUSE
4.2.4.B	Products supply requirements: B.1 Manufacturer's certificate: Materials shall be supplied with a certificate for each delivery. The certificate shall clearly state that products comply with the specified Standards and have been factory tested accordingly. B.2 Marking: Unless otherwise specified in the relevant Standard, products shall have legibly cast, stamped or indelibly painted on, the following marks, as appropriate: - Manufacturer's name, initials and identification mark. - Nominal diameter. - Class designation. - Initials and number of relevant Standard. - Length of pipe if shorter than standard length. - Angle of bends in degrees. - Date of manufacture. B.3 Special tests: if required by the Engineer, the Contractor shall supply and transport samples of materials selected by the Engineer to a testing laboratory.
4.2.4.C	Products handling: C.1 Manufacturer's recommendations on handling, repairing, laying, jointing, anchoring, testing and other works for pipes and fittings shall be followed. C.2 For loading and unloading, the Contractor shall use cranes, hoists or skidways as directed by the Engineer. Use of hooks, spreader beams, ropes, band or wire slings etc. shall be as recommended by the manufacturer of each type of pipe and as approved by the Engineer. C.3 Pipes shall be stacked on horizontal level surfaces. Pipes shall not be stored leaning on their sockets, flanges or jointing fairings. Chocks shall secure end pipes in bottom row. The allowable height of stacks shall be according to the manufacturer's instructions. C.4 Material and equipment shall be handled with care whenever moved by hand, skidways, forklifts or hoists and any damage incurred shall result in the material being rejected. C.5 The Contractor shall provide safe storage for material. The interior of pipes, fittings etc. shall be kept free from dirt and foreign matter. Shade for materials shall be provided as required by manufacturer's instructions and to the Engineer's approval. C.6 Cutting hacksaws, manually operated wheel cutters or pipe cutting machines shall be used by the Contractor as per manufacturer's instructions. If, in the opinion of the Engineer, special precautions are to be taken to eliminate airborne particles, the Contractor should take appropriate follow-up measures and use methods and equipment as directed by the Engineer. Ends shall be prepared according to type of joint used and as per manufacturer's recommendations. Care shall be taken to avoid any damage to the lining. Minor damage may be repaired on site as directed by the Engineer. C.7 The Contractor shall repair damaged coating, sheathing or lining in accordance with the Specification and manufacturer's instructions. Material used for repair work shall be compatible with that originally used. All repair works shall be approved by the Engineer before incorporating materials into the work.
4.3 ***4.3.1***	**PIPES, FITTINGS AND ACCESSORIES** ***MATERIALS***

Clause No.	CLAUSE
4.3.1.A	Polyethylene piping systems HDPE (For Water Supply): A.1 Polyethylene piping systems manufactured from PE100 (MRS 10), black in colour with blue identification stripes intended for the supply of drinking water compliant with the requirements of the international standards EN 12201, ISO 4427 and EN 1622. The pressure ratings shall be as indicated in the drawings and the bills of quuantities A.2 Installation in trenches. According to the standard ENV 1046 the width of the trench at the springline of the pipe, must not be greater than necessary to provide adequate room for jointing the pipe in the trench and compacting the pipe zone backfill at the haunches (typical values are bs=200 mm for DN≤300, bs=300 mm for 300≤DN≤900 and bs=400 mm for 900≤DN≤1200). When determining the trench depth, allowance for a suitable bedding should be incorporated. In general, care should be taken that the depth of cover above the crown of the pipe for pipes passing under traffic areas should usually be a minimum of 600 mm. The surface at the trench grade shall be continuous, uniform and free of particles greater than 15 mm for DN<100, 20 mm for 100≤DN<300, 30 mm for 300≤DN<600 and 40 mm for DN≥600. To provide a uniform support for the pipe the bedding layer should generally have a thickness of 100-150 mm and be not less than 50 mm and the material shall be granular such as gravel, sand or crushed rock. The backfill above the pipe zone should be placed by spreading in approximately uniform layers and compacted according to the various types of equipment and backfill materials. A.3 Bending: Pipes have a high degree of flexibility and can follow the undulations of the ground without bends, provided the radius of curvature is higher than a limit value, which depends on the SDR. A.4 Jointing: polyethylene piping systems shall be jointed through butt-fusion welding or electrofusion joints. The choice of the most adequate jointing technique between the two can affect the reliability and the long-term behaviour of the pipe network and as such shall be informed by the cost implication. HDPE Corrugated and Spiral pipes for Storm Water: B.1 For the storm water network HDPE pipes have been chosen corrugated ranging from a diameter of 250 to a diameter of 1600 with diameters from 1200 to 1600 being HDPE spiral pipes. All of them being SN08 class. These products must comply with EN 13476, ASTM F894 or equivalent. B.2 Fittings shall be injection moulded and to same standard as pipe or to BS4660. B.3 Joints shall be crucial to the system. Joint methods to use are: •ELECTROFUSION SOCKET JOINT The use of electrofusion socket joints is undoubtedly the preferred method of creating monolithic, permanently sealed and safe, uniform systems, quick and easy to lay, both for transport or storage of non-pressurised fluids, and for systems with moderate pressure values. The client must provide on site electric power for the proper functioning of electrofusion machines. For welding of DN > 1200 mm, 2 electrofusion machines are necessary.
4.3.1.B	•V EXTRUSION WELDING Pipes and couplings are joined by extrusion using a manual extruder. The outer ends of the contact points are shaped to create a V-shaped line. The socket-spigot type joint is not normally used. Welding is carried out in compliance with standard DVS 2207-4 •EXTRUSION WELDING For pipes and couplings that must be connected using a spigot in socket system, the two ends are welded at the joints by manual extrusion, both internally and externally. This joining method can also be applied to one of the two parts only (inner or outer). This type of joint can also be suitable for pipe networks operating under slight pressure and for manholes. Welding is carried out in compliance with standard DVS 2207-4. •BUTT WELDING Pipes and couplings are joined using a machine with a molten abutment. The ends of the pipes and couplings are butt- welded. This method is recommended for pipes and couplings with a maximum contact wall thickness of 150 mm in a range of diameters between DN 300 and 2500 mm. The weld is formed in compliance with standard UNI 10520 (PE80), UNI 10967 (PE100) and/or DVS 2207-1. •FLANGED JOINT: The ends of the pipes and fittings are connected by means of a steel flange and a gasket. Depending on the type of pipe to be connected, the stubs are produced at the end of the bar, or can be delivered as a seam. This type of junction is mainly used for underwater drainage works, or for connecting elements forming tanks or storage more generally. One of the great advantages of this junction is the ease of dismantle.

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4.3.1.C	HDPE and PVC pipes for sewage: D.1 For the sewage system HDPE pipes for diameter 1000 has been chosen and PVC pipes for diameters ranging from 200 to 800 have been selected. As for HDPE pipes refer to 4.3.1 A D.2 Pipes shall conform to DIN 8061 / 8062, BS EN 13476-1, 2 and 3, BS EN 1401-1 or DIN 19534-3, with a minimum working pressure of 6 bar except if otherwise indicated on the Drawings or the Bill of Quantities. Use concrete slab if cover is less than 1 meter or greater than 5 meter. Pipes to BS EN 13476-1-2 or BS 1401-1 or DIN 19534-3 may be used provided the wall thickness is equal or greater than that of six bar pipes of equivalent diameter. D.3 Fittings shall be injection moulded and to same standard as pipe or to BS 4660. D.4 Joints shall be socket spigot with rubber sealing rings to BS EN 681-2.
4.3.2	***CONSTRUCTION AND INSTALLATION***
4.3.2.A	Pipe Trenching and Bedding: A.1 Pipe bedding material shall be as specified in sections 2.3.7 and 2.4.5 of Specifications – Volume 2- Earthworks A.2 Type of Bedding shall be as indicated on the Drawings
4.3.2.B	Pipe Laying and Jointing - Generally A: B.1 Pipe bed shall be brought to grade and approved by the Engineer prior to the lowering of the pipe into the trench. B.2 Lowering of the pipe into the trench shall be carried out using ropes, wire slings, band slings, and spreader beams to avoid damages to pipes. B.3 All material shall be carefully examined for damage and tested in accordance with manufacturer's instructions before laying to the satisfaction of Engineer. B.4 The Contractor shall examine material to ensure internal coating or lining and outer coating or sheathing are undamaged. If damaged, make good or dispose of as directed. B.5 Pipe Cleanliness: The Contractor shall remove dirt and other materials before lowering. B.6 Pipe Cleanliness: The Contractor shall clear construction debris from inside of pipe before making joint. B.7 Pipe Placement: The Contractor shall lay pipes on even formations true to grade and line, with sockets (if any) facing up the gradient.
4.3.2.C	Pipe Laying and Jointing - Generally B: B.8 Pipe on Solid Ground: The Contractor shall cut holes in bottom of trench to allow proper jointing and ensure continuous uniform support on solid ground along the barrel of pipe for its full length. B.9 Pipe on Granular Bedding: The Contractor shall scoop out locally at sockets/couplings to enable pipe to rest uniformly on barrel and adjust to exact line and level. After testing, the Contractor shall lay and compact further granular material in 150 mm layers or as approved to levels shown on the Drawings. B.10 Pipe on Concrete Bed or Surround: The Contractor shall provide rectangular blocks of concrete Class 20/25 (EN206), made in approved moulds at least 14 days before use, and approved hardwood folding wedges and also provide two concrete blocks for each pipe, set and brought into correct level on formation bottom and lay pipe properly centred and socketed. The Contractor shall insert two hardwood folding wedges of width equal to width of concrete block between body of pipe and block and drive together until pipe is brought to exact level required and leave blocks and wedges undisturbed while pipes are being jointed and concrete bed and haunch or surround are being placed. The Contractor shall ensure blocks and wedges are of
4.3.2.D	Jointing: C.1 Manufacturer's instructions shall be followed regarding placement of bedding and backfilling, cleanliness of joint surfaces, lubricant used, correct location of components, provision of correct gaps between end of spigot and back of socket for joints etc. C.2 Deflection of Joint: The Contractor shall not deflect joints beyond maximum permissible angles given by manufacturer and/or relevant Standard. C.3 Patent Detachable and Flexible Joints: The Contractor shall strictly comply with special instructions issued by

Clause No.	CLAUSE
4.3.2.E	Line and Gradient: D.1 In Open Excavation: The Contractor shall provide and maintain sight rails and boning rods properly painted to ensure correct alignment of pipe runs. Sight rails shall be positioned either vertically above the lines of pipes or immediately adjacent thereto. At no time are there to be less than three sight rails in position on each length of pipeline under construction to any one gradient.
4.3.2.F	Tolerances: Gravity Sewers: Tolerances shall be 6 mm in level and 25 mm in line between manholes or access points unless otherwise specified. Where pipe is to be constructed in straight lines between manholes the length will not be accepted if a light at each manhole cannot be seen from adjacent manholes.
4.3.2.G	Floatation: F.1 Prevention: Whenever water is excluded from interior of pipe, the Contractor shall place sufficient backfill above pipe to prevent floatation.
4.3.2.H	Pipe Built into Structures: G.1 Treatment of External Surface: The Contractor shall thoroughly clean outside surface of pipes to be built-in immediately before installation and remove protective coating and proceed as per method of statement as approved by the Engineer.
4.3.2.I	Irrigation and Water Pipe Cover: H.1 Provide minimum cover over top of underground irrigation and water piping as per drawings H.2 If excavated material is considered satisfactory for backfill by the Engineer it can be used. Backfill shall be free from rubbish, vegetable matter, and stones larger than 5mm and from sharp objects that may damage the pipe.
4.3.2.J	Pipe sleeves: Install piping in sleeves as indicated on drawings at crossings of sidewalks, parking lots, roadway and the like. Sleeves shall be installed at a depth that permits the encased pipe to remain at the specified burial depth. I.2 Extend sleeve ends 15 centimetres beyond the edge of the paved surface.
4.3.2.K	Warning Tape: J.1 Install detectable warning tape directly above pressure piping, 300 mm below finished grades, except 150 mm below sub-grade under pavement and slabs. J.2 Warning tape shall be of plastic film highly resistant to alkalis, acids or other destructive components. The tape to be 8-10cm wide and imprinted with “CAUTION: WATER PIPE LINE BELOW.”
4.3.3	***PIPEWORK TESTING***

Clause No.	CLAUSE
4.3.3.A	Field Testing: Generally: A.1 Provision of Test Equipment: All items for test have to be provided on site before the test i.e. pressure gauges, instruments, water etc... A.2 The Contractor shall carry out tests in the presence of the Engineer. A.3 Fittings and Joints: The Contractor shall permanently anchor fittings before testing and leave all joints exposed for checking. A.4 Test Sections: The Contractor shall limit test sections to not more than 500 m. A.5 Test Sections: The Contractor shall test pressure lines between valve chambers whenever possible. A.6 Test Sections: The Contractor shall test gravity sewers in sections between manholes. A.7 Test Sections: No testing shall be carried out against or through the pressure reducing valves. The setting of the pressure reducing valves shall not be changed for testing purposes. A.8 Test Plug: The Contractor shall secure end of main and test plug by struts. A.9 Closed Valve: The Contractor shall not test against a closed valve unless there is no acceptable alternative. A.10 The Contractor shall apply pressure by manually operated test pump or, in the case of large diameter mains, by power driven test pump, if approved. A.11 The Contractor shall examine exposed joints and repair visible leaks. A.12 Failure: Should a test fail, the Contractor shall locate the leak and replace or make good defective pipe or replace and make good faulty joint. The Contractor shall retest main. A.13 Records: The Contractor shall keep test records in an approved form and hand original copy to the Engineer immediately after completion of test. A.14 Pressure Lines: The Contractor shall carry out hydrostatic test while pipeline is partially backfilled. A.15 Non-pressure lines not exceeding 1000 mm diameter shall be air tested before partial backfilling and hydrostatic
4.3.3.B	Hydrostatic Testing of Pressure Pipelines: B.1 The pipeline shall be filled slowly with water from the lowest point. After filling with water, absorbent pipes shall be allowed to stand for at least 24 hours before testing to allow for complete absorption. B.2 Entrapped air shall be bled and pressurising shall then proceed until the specified test pressure is reached in the lowest part of the pipeline section under test. Further quantities of entrapped air shall be bled while the pressure is being raised. B.3 Unless otherwise specified, the test pressure shall be equal to 1.5 times the maximum working pressure of the pipeline as shown on the Drawings or as determined by the Engineer on Site, but shall in no case exceed 75% of the factory hydrostatic test pressure. B.4 The test pressure shall be maintained for one hour by pumping using a separate test pump. Pumping shall then be stopped for 2 hours, at the end of which time the line shall be re-pressurized to the original test pressure and the volume of water pumped into the line recorded. B.5 The pipeline shall be deemed to have failed the test if visible leaks are detected (regardless of leakage being within the allowable specified limit) or if the volume of water pumped to restore original test pressure after the period when pumping is stopped, exceeds 0.1 litre/day per km of pipe per mm of pipe diameter for each 3 kg/ cm2 of applied pressure for other pipe material.

Clause No.	CLAUSE
	Hydrostatic Testing of Non-Pressure Pipelines: C.1 Procedure shall be as described in EN 1610.
	C.2 Test Pressure: 1.0 m head of water above pipe soffit at highest point and not greater than 6 m head of water at lowest point of section under test. If maximum head is exceeded, the Contractor shall test section in stages.
4.3.3.C	C.3 Test period shall last 30 minutes.
	C.4 Allowable Leakage for pipes: 0.5 litres/linear metre/ diameter (m) /30 minutes.
	C.5 Allowable Leakage for pipelines including structures or for structures alone: As specified in EN 1610.
	Air Testing of Pipelines: D.1 The Contractor shall carry out tests to EN 1610 and plug length under test.
	D.2 The Contractor shall apply pressure by approved method (i.e. hand pump) until a pressure 100 mm head of water is indicated on a U-tube connected to the system.
4.3.3.D	D.3 The Contractor shall allow 5 minutes for stabilisation of air temperature and adjust pressure to 100 mm
	D.4 Pressure Drop: Pressure shall not be allowed to fall by more than 25 mm in a period of 5 minutes.
	D.5 Failure to pass the air test is not conclusive and if no leakage can be traced by external application of soapy water to all sealing areas then a hydrostatic test shall be carried out before final rejection.
	Infiltration Test for Gravity Pipes: E.1 Timing: The Contractor shall carry out test after total backfilling of length under test.
	E.2 The Contractor shall plug all inlets to system as directed.
	E.3 The Contractor shall measure residual flow by approved method i.e. weir or other.
4.3.3.E	E.4 Infiltration Limits: The following limits are not to be exceeded: - Pipelines Not Exceeding 700 mm: 0.02 litres/hour/100 linear metres/mm diameter, - Pipelines over 700 mm: 0.03 litres/hour/100 linear metres/mm diameter.
	E.5 Failure: Tests shall be deemed to have failed if allowable infiltration of water is exceeded. The Contractor shall locate source of excessive infiltration by approved means i.e. traversing light and mirrors or inflated rubber plug etc., make good, and repeat tests until successful.
	Visual Inspection Test: F.1 Timing: The Contractor shall carry out test after total backfilling of length under test.
	F.2 Limit of length to be tested at one time is three full- length pipes unless otherwise approved.
4.3.3.F	F.3 Apparatus: The Contractor shall use rubber tyre bogies that do not damage lining of pipe and an adequate supply of electric lamps.
	F.4 The Contractor shall check joints by means of feelers to ensure rubber rings are correctly located.

Clause No.	CLAUSE
	Flushing and Disinfection of Water Mains: G.1 Procedure: To AWWA C651.
	G.2 The Contractor shall provide equipment, gauges, temporary connections and chlorine needed for flushing and disinfection and arrange with the Employer to draw water from existing sources.
	G.3 Sections: The Contractor shall flush and disinfect mains in sections as directed by the Engineer.
	G.4 Draining: The Contractor shall use washout valves and fire hydrants to drain flushing and disinfecting water.
	G.5 First Flushing: Before commencing disinfection, the Contractor shall flush mains until effluent is clean and then clean as directed. 1 to 2 times volume of pipe is usually required for such flushing.
4.3.3.G	G.6 Type of Chlorine: The Contractor shall disinfect with chlorine gas or solutions of calcium hypochlorite or sodium hypochlorite and agree with the Engineer on method of application.
	G.7 Initial dosing shall be 40-50 ppm. G.8 Contact period shall be 24 hours. G.9 Residual Chlorine: The Contractor shall measure residual chlorine by Orthotolidine test. Residual chlorine shall not to be less than 5 ppm or the test shall be repeated as directed.
	G.10 Final Flushing: After disinfection, the Contractor shall re-flush network until chlorine concentration in water leaving main is less than 1 ppm.
	G.11 Tests: The Contractor shall perform bacteriological tests to AWWA C651, Section 9. Number of samples shall be one per 1 km of main feeders and one per 0.25 km of distribution lines.
	G.12 Procedure after Cutting into Existing Main: To AWWA C651, Section 11.
	Field Protection and Coating: H.1 Polyethylene sleeving shall be in accordance with the manufacturer's instructions.
4.3.3.H	H.2 Patented Detachable and Flexible Joints and Flanged Connections: The Contractor shall protect metal joints with mastic compound and protective tape in accordance with the manufacturer's instructions. Minimum overlap shall be 55% and the Contractor shall press out firmly all folds and irregularities.
4.3.3.I	Cleaning and Inspection of Sewers: I.1 Cleaning: The Contractor shall clean pipeline of silt and debris after backfilling pipe trenches and completing manholes, hatch boxes etc. but before surfaces are permanently reinstated and make ready for inspection by the Engineer.
4.3.3.J	Flushing of Irrigation Pipes: J.1 Flushing: The contractor shall flush dirt and debris from irrigation piping before installing irrigators and other devices. J.2 Equipment: The contractor shall provide equipment, gauges and temporary connections needed for flushing and arrange with employer to draw water from existing sources.
4.3.3.K	Waterproofing of Structures: K.1 Waterproofing of water retaining structures shall not be commenced until tested for water-tightness and found satisfactory.
	K.2 Refer to chapter 5.6 of Vol 5 of the Specifications for waterproofing of structures.
4.4	**VALVES, GATES, STOPS, FIRE HYDRANTS AND SUNDRY WORKS**
4.4.1	***GENERAL***
4.4.1.A	Scope: A.1 These works shall consist of furnishing all materials, constructing, installing and completing in all respects of works described in this Specification and indicated on the Drawings.
4.4.2	***VALVES***

Clause No.	CLAUSE
4.4.2.X	General: A. The following criteria will be adopted for the valve strategy of the water distribution network: -Valves on the distribution network will have the same diameter as the water main -Valves on transmission mains with diameter greater than 750mm will be one size smaller than the water main -Two valves are required to isolate a Tee intersection and three valves are required to isolate a cross intersection; -Air release valves and washout valves will be provided at high and low points respectively on pipes having a diameter greater than 200mm. -Washout of the network with pipes having diameters less than or equal to 200mm will be through fire hydrants that are installed on the network. B. Isolation valves are provided at each pipe branch of the main distribution lines for localized isolation of pipe sections. C. Washout valves are provided at low points and air valves at high points of pipes. D. Automatic Remote Control (Solenoid) valves are provided to command the secondary network composed of irrigators connected to lateral pipes. E. The size of the solenoid valve depends on the flow in the secondary network downstream the valve. Each solenoid valve is provided with a pressure regulator module capable of regulating downstream pressure between 1 to 6.9 Bar (within an accuracy of +or- 0.35 Bar) regardless of upstream pressure. F. Quick coupling valves are located as necessary for hose connection near sidewalks, entryways and parking lots G. All valves and fittings within chambers shall be ductile iron H. Factory Protection: Casting surfaces are to be given an initial coat of protective paint immediately after shot blasting and a second coat on assembly. Protective coating can be - hot applied coal tar or bitumen to BS 4164 or BS 3416 respectively. Thickness of coat to be 250 microns. - internal and external epoxy coating in compliance with DIN 3476 part1, EN 14901 - External PUR coating for galvanic corrosion prevention .PUR coating of minimum 1.5 mm according to EN 10290 type 2,
4.4.2.A	Gate Valves: Ductile Iron: A.1 Type: size 300 mm and smaller to BS EN 1563 2011, inside screw solid wedge, resilient seated, bolted bonnet, rising stem type. The pressure rating of the valve shall be 1.5 times the system operating pressure but not less than 16 bars for water supply systems. A.2 End Connections: Size 50 mm and smaller screwed end to BS 21. A.3 End Connections: Size 65 mm and larger flanged end connection to BS EN 1092-2. A.4 Operation: Valves larger than 400 mm diameter are to have spur gear drive operated by removable key. Valves smaller than 400 mm are to be operated by hand-wheel. A.5 Opening: The valve operating nut or wheel shall have an arrow cast in valve indicating the direction of opening. A.6 Valves can have either lever or non-rising stem and hand wheel or rising stem and hand wheel, pneumatic actuator, ISO top flange for actuator or complete with electric actuator.

Clause No.	CLAUSE
4.4.2.B	Butterfly Valves: Ductile Iron: B.1 Type: To BS EN 593, double flange with resilient seating, for horizontal use. B.2 Size: even for valves greater than 100 mm in water supply. B.3 Material of component parts shall be from basic materials listed in BS EN 593 Table 3. B.4 End Connections: Flanged to BS EN 1092-2. B.5 Operation by hand wheel. Maximum shut off pressure against which valve operated is to be 15 kg/cm2. B.6 Protection coating: refer to 4.4.2. Valves H. B.7 Pressure Rating: The pressure rating of the valve shall be 1.5 times the system operating pressure but not less than 16 bars for water supply systems.
4.4.2.C	Electrically Actuated Ductile Iron Butterfly Valves: C.1 Electrically Actuated Ductile Iron Butterfly Valves shall comply in all respects with DIN 3354 PN16, body of ductile iron SG-GGG-50 valve disc shall be of stainless steel 316 C.2 All valves shall be coated with epoxy internally and externally to average DFT 300 microns for protection against corrosion of body components. C.3 Butterfly valve shall be flanged type to DIN 250, part 1 for PN 16, face- to-face dimensions to din 3202-k1 corresponds to ISO 5752, concentric type, stream lined design with replaceable seat ring, fusion bonded on backing ring, leak tight closure on both directions. For operation at differential pressure at maximum 16 bars with operating gears with electric part turn actuator. C.4 Variant DN-40-300, K1, seat ring NBR (BUTA N), Shaft S.S 1.405, maximum working temperature +80 degree centigrade with maximum working pressure 16 bars. C.5 All bolts and nuts to be of stainless steel grade 316/A4-70. C.6 Electric actuators shall have to open and close at least 60 seconds, and shall be provided with an auxiliary operating wheel. The motor control should allow for stepped closing of valve pausing at 1/2 closed and 1/4 closed. C.7 Motor and electrical protection shall be in strict accordance with the electrical specifications and Authorities regulations. Motors shall be rated to operate at an ambient temperature of 50 degrees centigrade, and a relative humidity of 100%. C.8 Complete control of the valve including partial closing of valve should be possible through the central control system. C.9 Electrical components shall be protected from condensation.
4.4.2.D	Ball Valves: D.1 Ball valves 90 mm and under shall be full port of 2-piece construction, lever operated with bronze body and stem, chrome-plated brass ball, replaceable PTFE seats and packing, plastic coated steel handle, threaded end connection for steel piping, and copper compression or solder end connections for copper piping. D.2 Ball valves 150mm to 1200mm shall comply with the requirements of AWWA C 507. D.3 The pressure rating of the valve shall be 1.5 times the system operating pressure but not less than 16 bars for water supply systems.

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	Check Valves: E.1 Check valves shall be to BS EN 12334, swing, straight, for horizontal use. E.2 Material of Component Parts: Ductile iron from basic materials listed in BS EN 12334. E.3 Special Requirements: Seating or facing rings are to be renewable. An arrow showing direction of flow is to be visible from outside and cast integral with the valve housing.
4.4.2.E	E.4 End Connections: Either flanged to BS EN 1092-2, or screw ended to BS EN 10226-1 to suit joints specified for adjoining pipes. E.5 Factory Protection: Casting surfaces are to be given an initial coat of protective paint immediately after shot blasting and a second coat on assembly. Protective coating is to be hot applied coal tar or bitumen to BS 4164 or BS 3416 respectively. Minimum thickness of coating shall be 250 microns. E.6 Pressure Rating: The pressure rating of the valve shall be 1.5 times the system operating pressure but not less than 16 bars for water supply systems.
4.4.2.F	Air Valves: F.1 Generally: Valves are to have cast iron body and bolted cover to BS EN 1561 grade 14 minimum, rubber outlet seat, plastic or ebonite ball, forged bronze screws and guide for ball acting under pressure. Valves are to be dynamic type where there is no possibility of ball being drawn into orifice due to high air velocities. Valves shall be of the anti-shock and anti-surge type. Valves are to be factory tested to 1.5 times working pressure and factory coated with coal tar or bituminous coating to BS 4164 or BS 3416 respectively. Thickness of coat to be 250 microns. Valve material, design, inspection, testing, marking, handling and packaging to AWWA/ANSI C512-07. F.2 Double Air Valves (or Combination Air Valves): These are required for relieving air under pressure and in bulk. Large orifice releases or admits air during charging or emptying of mains while small orifice releases air accumulated at summits of mains under pressure. Large orifice area is to be equal to or greater than inlet of valve. Valves are to be fitted with nitrile rubber lined butterfly valve with nylon-coated disc on stainless steel shaft operated by lever handle with indicator and locking thumb screw. Valves are to be flanged in accordance to BS EN 1092-2. F.3 Single Air Valves: Type 1 (or air vacuum valve) for releasing or admitting air during filling or emptying of pipes. Type II (or air release valve) for automatically releasing, under pressure, accumulated air at summits of mains. Air valves larger than 50 mm are to be flanged in accordance to BS EN 1092-2 and are to have nitrite rubber lined butterfly valve with nylon-coated disc on stainless steel shaft operated by lever handle with indicator and locking thumb screw. Air valves 50 mm and smaller are to have B.S.P. thread with brass or gun metal male screwed stop valves. F.4 Pressure Rating: The pressure rating of the valve shall be 1.5 times the system operating pressure but not less than 16 bars for water supply systems.
4.4.2.G	Pressure Reducing Valves - Generally: G.1 Types: Installed where shown on the Drawings to pressure ratings and pressure settings indicated, to automatically reduce higher inlet pressure to steady lower downstream pressure regardless of changing flow rate and/or varying inlet pressure. Valves are to be high pressure rating piston type and hydraulic pilot operated type. G.2 Accessibility: Maintenance is to be possible without removing valve from pipeline. G.3 End Connections: Flanged to BS EN 1092-2 to pressure rating of 10, 16 or 25 as appropriate and provided from factory with necessary bolts, washers, nuts and gaskets. G.4 Factory Protection: Internal coating of epoxy to a thickness of 250 microns and external coating of epoxy and nickel plating to a thickness of 250 microns. G.5 Pressure Rating: The pressure rating of the valve shall be 1.5 times the system operating pressure but not less than 16 bars for water supply systems.

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4.4.2.H	Pressure Transmitter Requirements: H.1 Gauge pressure transmitters shall have two-way manifolds to facilitate isolation and calibration. Manifolds shall be mated to transmitters and the assembly factory tested under pressure prior to installation. Manifolds shall be integral mounted "coplanar" with 316 SS flange, drain and vents. H.2 Pressure Transmitter process and technical requirements shall include the following unless otherwise noted: 1. Pressure transmitters shall be 2-wires devices 2. Integral LCD meter scaled in engineering units 3. Solid-state circuitry 4. 4-20 mA output 5. Housing and process wetted materials: 316L stainless steel 6. Valve Manifolds: 316L Stainless Steel 7. Transmitter with integral LCD shall be IP67 suitable to be located in a valve / flowmeter underground chamber. 8. Conduit connections: ½ inch 14NPT 9. Screw terminals for all connections 10. Factory calibrated for span and range 11. Operating temperature range: 0 to 60 degree C. 12. Accuracy rating: +/- 0.2% rate 13. Repeatability: +/- 0.1% of reading 14. Stability: +/- 0.1% of rate over six months 15.Range: adjustable measuring range of approximately two times the normal operating pressure and a minimum turndown ratio of 10:1. 16. Capillaries: 5m long, PVC coating on 316SS armoured sleeve 17. Accessories such as special interconnecting signal cables, connectors, fittings or calibration software 18. It shall be similar to Endress and Hausser or identically approved
4.4.2.I	Flowmeters: I.1 General Flow monitoring for phase 1 network is mainly measured at strategic locations to enable to integrate the water supply system with the smart city design once water meters are installed for all plots. Flow meters are installed at the following strategic locations: - Connection to main water supply line feeding phase 1 the network from the North It is worth noting that pressure monitoring valves are also installed at strategic locations in the network to detect pressure drops due to breakage that may occur in the network. I.2 Type: the flow meters shall be of the helical rotary type for diameters less than 300 mm and clamp-on ultra-sonic meters for 300 mm pipe diameters and larger; and suitable for the flow range and conditions at the location of use. It shall not be sensitive to magnetic field and horizontal installation. It shall be accurate to within 0.3% of the flow rate over the application operating range when the velocity is within 0.01 to 5 m/s. Accuracy shall be maintained for an ambient temperature range of 0 to 50 deg. C. Accuracy shall be verified by calibration in a flow laboratory approved by the Engineer. I.3 Measurement: the meters shall measure the instantaneous rate of flow as well as total flow. It shall be inherently bi-directional and should total forward and reverse flow separately. The meter shall include a detector to constantly monitor whether the pipe is full and all electronics, electrodes, sensors and cable connections are operating correctly. Any fault shall be indicated immediately via a relay to any remote device as directed by the Engineer. No negative reading shall be imposed by air passage or suction due to the emptying of the pipe system upstream from the meter. I.4 The meter shall be equipped with an integrated two lines 16 digits LCD indicator that displays flow rate and total. Shall have potable water contact materials WRAS listed. I.5 The meter shall have an 80-300 VAC power supply. I.6 The meter shall be equipped with a data transmission system. I.7 Construction: The meter shall be made of corrosion and wear resistant materials and manufactured to ISO 9001 and ISO 14001. It shall have dial glass wipers. The meter shall be sealable against unauthorized tampering and shall have a hermetically sealed register.
4.4.3	***IRRIGATION SPECIALTIES***

Clause No.	CLAUSE
4.4.3.A	:
4.4.3.B	:
4.4.4	***FIRE HYDRANTS***
4.4.3.A	:
4.4.3.B	:
4.4.5	***JOINTING MATERIALS AND ADAPTORS***
	Generally: A.1 Gaskets: Elastomeric full face 3 mm thick joint rings to ISO 4633 or BS EN 681-2 with dimensions to BS 3063. A.2 Rings: Elastomeric to ISO 4633 or BS EN 681-2 with dimensions to manufacturer's recommendations to suit type of joint required.
4.4.5.A	A.3 Bolts and Nuts: ISO metric black hexagon to BS 4190, minimum tensile strength 433 MN/m2, maximum elongation 17%. After fixing, bolt projection shall to be maximum 6 mm, minimum 3 mm. A.4 Washers: Black steel shall be to BS 4320 or ISO 887. A.5 Dielectric joints shall have insulating gasket between flanges and Teflon sleeves and washers between bolts and nuts and flanges. Joints are to be suitable for operating pressure of system.
	Flexible Couplings: B.1 Type: Gasketed sleeve type, to allow angular deflection and axial movement of two joined pipe ends and to maintain permanent, leak-tight joint. B.2 Components comprise one centre sleeve, two end followers or flanges, two rubber- compounded wedge-section gaskets and sufficient draw bolts and nuts to properly compress gaskets. Tightening of bolts to draw end followers together is to compress gaskets in recess between centre sleeve and followers onto pipe ends to effect positive seal. B.3 Size: Couplings are to have diameter specifically supplied for and to properly fit type of joined pipe ends. Centre sleeve is to be of adequate thickness and whole coupling suitable for minimum working pressures shown on the Drawings. B.4 Centre Sleeve and Followers shall be true circular sections, free from irregularities, flat spots or surface defects and formed from steel mill sections with space between sleeve and follower designed to provide confinement of gasket.
4.4.5.B	B.5 Bolts shall be special steel having minimum yield strength of 2800 kg/cm2 (40,000 psi) and ultimate strength of 4200 kg/cm2 (60,000 psi). Bolts shall be track-head design to prevent turning when nut is drawn up and threads are to be rolled with a nominal diameter larger than diameter of shank. Manufacturer shall supply information regarding recommended torque to which bolts are to be tightened. B.6 Gaskets shall be synthetic rubber-base compound with other products to produce material which will not deteriorate from age, heat or exposure to air and which is resilient and able to resist cold flow of material so that joint will remain sealed and tight indefinitely when subjected to shock, vibration, pulsation, temperature and adjustment of connected pipes. B.7 Factory Protection: Coupling shall be factory painted internally with 10 mils coating of epoxy and externally with red primer to AWWA C203 Type B chlorinated rubber solution compatible with bitumen, coal tar and general paints. B.8 Installation: Couplings are to be assembled on site in accordance with manufacturer's instructions to ensure permanently tight joints under all conditions of expansion, contraction, shifting and settlement.

Clause No.	CLAUSE
4.4.5.C	Dismantling Couplings: C.1 Type: These shall ensure extensible connection between sections of pipework, to be mounted next to valves to enable easy dismantling from pipework or to permit joining pipework when butterfly valve is removed for maintenance. C.2 Components: Dismantling piece shall be flanged type composed of two parts, one sliding into the other, and a free flange to compress a trapezoidal section seal to ensure water tightness. Coupling shall have locking devices to provide elements of complete rigidity. C.3 Construction: All steel with flanges class PN 10, PN 16 or PN 25 depending upon coupling location on pipework. C.4 Size: Couplings shall have diameter specifically supplied for and to properly fit type of joined ends of pipes and valves. Coupling shall permit tightening of end flanges without risk of misalignment. Seal shall be locked after end joints are tightened.
4.4.5.D	Flanged Adaptor: Ferrous: D.1 Material: Cast iron to BS EN 545. D.2 Length of adaptor shall be 200 mm for diameters up to 150 mm, 250 mm for diameters between 200 and 300 mm and as approved for diameters larger than 300 mm. D.3 Factory Protection: Hot coil tar based hot applied coating materials to BS 4164 or cold application of Bitumen-based coating to BS 3416.
4.4.6	***VALVE ACCESSORIES***
4.4.6.A	Accessories: A.1 Hand-wheels shall be to BS EN 1074-2, of cast iron to BS EN 1561. Hand-wheels are to be marked 'CLOSE' with an arrow to indicate clockwise direction of closure. Diameters and other constructional details shall be to manufacturer's standards. Hand- wheels are to be supplied at a rate of 1 in 5 valves. A.2 Valve caps shall be to BS 5163-2, of cast iron or malleable iron to BS EN 1561 and BS EN 1562, respectively. Set screw of valve cap is to be mild steel M12. A.3 Operation Keys: Combination prising bar and lifting key type, with 1.5 m vertical bar and 0.5 m horizontal bar. Keys are to be supplied at a rate of 1 in 5 valves. A.4 Extension Spindles for Gate Valves: Steel to BS 2470 - M12, hot dip galvanized to BS EN 10255, size 18 x 18 mm for valves up to 200 mm diameter and 24 x 24 mm for valves 250 mm to 400 mm diameter. Length for each valve size is to suit excavation requirements. Spindles are to have cast iron or malleable iron cap and coupling, to BS EN1561 and BS EN 1562, respectively, on both sides of extension spindle (cap for operating spindle and coupling for connecting to valve). Set screws of caps and couplings are to be mild steel M12. A.5 Protection Tubes: Either UPVC or cast iron. Shape, sizes and other constructional details are to be to manufacturer's standards and/or as shown on the Drawings. Tubes are to have caps circling extension spindles. A.6 Surface boxes shall be to BS 5834 Part 2. Frames and lids are to be cast iron to BS EN 1561, studs, bolts, nuts and hinge pins are to be mild steel M12, chains are to be mild steel or wrought iron and lid is to have the letter 'W' cast on. Boxes are to be of the following types: - For carriageways (wheel loads up to 11.5 tons) Heavy grade type A: - For use where heavy commercial vehicles are exceptional: Medium grade type M - For use in places inaccessible to wheeled vehicles; Light grade type L A.7 Lifting Key Sets: Malleable iron, supplied at the rate of one (1) per five (5) covers installed or fraction thereof. A.8 Guards for Underground Stop Valves: PVC, shape and size and other constructional details to manufacturer's standards and/or as shown on the Drawings.
4.4.7	***VALVE OPERATORS***

Clause No.	CLAUSE
	General: A.1 Gate, butterfly and ball valves are to be manually or electrically operated depending upon size, torque applied on valve stem or as shown on the Drawings.
4.4.7.A	A.2 Valves 350 mm and smaller are to be operated manually with a maximum applied torque on hand wheel of 100 Nm A.3 Valves 400 – 500 mm are to be operated manually with a maximum applied torque of 150 Nm A.4 Valves of higher torque are to have appropriate thrust bearings, slides and gearboxes to fulfil these requirements
4.4.7.B	Manual Gearboxes: B.1 Type: Totally enclosed, sealed construction to protect moving parts from damage and corrosion. Gearbox is to be either spur or level type depending upon mounting position of valve. B.2 Components shall include corrosion resistant bearings, gear of rugged cast iron construction, cast housing cover complete with seals and gaskets and hand wheel actuator. Housing cover is to have indicator window to show position of valve. Gearbox is also to have stainless steel bolts.
	Electric Valve Operators: C.1 Type: These shall consist of motorized unit including gear train mounted in cast iron housing, flange mounted electric motor, control cabinet and hand wheel for manual operation. C.2 Installation shall be suitable for flange mounting directly on valve body, for gate valves with non-rising stem and for manual operation locally. C.3 Rating shall be of adequate horse-power and thrust ratings to open and close operated valve smoothly at all conditions of load and pressure. C.4 Components shall include adjustable mechanical stop- limiting devices to prevent over-travel of valve in either direction. Operator housings, supports and connections to valve are to have a minimum safety factor of five (5) based on ultimate strength of materials used.
4.4.7.C	C.5 Construction: Weatherproof, with rugged cast iron housing and with hand wheel having appropriate gearing for emergency manual operation such that maximum applied torque is 150 Nm. Declutch lever is to disengage drive motor during hand wheel operation and prevent hand wheel rotating during power operation for safety of personnel. Hand wheels are to close valve in clockwise direction and are to have arrows and the word 'CLOSE' cast on. C.6 Controls shall comprise integral electric controls enclosed within weatherproof compartment and including magnetic starter and reversing controller for motor, open-stop- close push-button for local operation, limit switches to give remote indications when valve is fully opened or closed, torque switch to shut down drive on excessive thrust loads, indicating lights, control voltage transformer etc. C.7 Electric Motor: Totally enclosed, squirrel cage, induction type conforming to NEMA Publication No. MG1 including characteristics, tests and ratings. Motor shall carry maximum possible load encountered in valve operation under all normal and abnormal operating conditions without exceeding nameplate rating and without benefit of service factor.
4.4.8	***IRRIGATION VALVE ACCESSORIES AND OPERATORS***
4.4.9	***CONSTRUCTION AND INSTALLATION***
	Generally: A.1 Prior to Installation, the Contractor shall inspect for cleanliness of bores, seating surfaces etc. and for handling damage, cracks, missing parts and tightness of pressure- containing bolting.
4.4.9.A	A.2 The Contractor shall ensure gates and hydrants are in closed position before installation. A.3 Operate hydrants through one complete opening and closing cycle in the position in which they are to be installed to ensure proper functioning.

Clause No.	CLAUSE
4.4.9.B	Installation of Valves: B.1 Prior to installation, valves shall be inspected for cleanliness of bore, seating surfaces etc. and for handling damage, cracks, missing parts and tightness of bolting. Valves shall be in close position before installation. B.2 Valves shall be operated through one complete opening and closing cycle in the position in which they are to be installed to ensure proper functioning. B.3 Valves shall be set and jointed to the pipe in the manner specified for laying and jointing pipe and in accordance with the manufacturer's recommendations. Each valve shall be provided with a concrete pad as shown on the Drawings so that the pipe does not support the weight of the valve. Valves shall not be used to spring misaligned pipe into alignment during installation. B.4 Valves without concrete pads shall be placed on firm footing to prevent settling and excessive strain on connection to pipe. B.5 All stressed bolts (bonnet, seal plate and end connections) shall be inspected for adequate tightness after installation and prior to field-testing. B.6 Valves shall be protected against action of external agents by a coat of approved bituminous compound, applied cold by hand brushing after pressure tests on pipelines have been completed. Buried bolts etc., shall be protected against corrosion, with approved paint or polyethylene wrapping.
4.4.9.C	Installation of Hydrants: C.1 Join hydrants to pipe in manner specified for laying and jointing pipe and/or to manufacturer's instructions. C.2 Set hydrants to established grades as directed by the Engineer. C.3 Set hydrants plumb with nozzles parallel with or at right angles to the curb. Where hydrants have a pumper nozzle, set the latter facing the curb. Where hydrants have two hose nozzles 90 deg. apart, set with each nozzle facing the curb at 45 deg. angle.
4.4.9.D	Field Protection: D.1 Valves: The Contractor shall protect valves against action of external agents by a coat of approved bituminous compound applied cold by brush after pressure tests on pipelines have been completed. D.2 Hydrants: The Contractor shall apply one coat of paint, of colour specified by the Engineer, after backfilling and surface restoration is completed. D.3 Gates: The Contractor shall protect against action of external agents with one coat of approved bituminous compound applied cold by brush after installation. D.4 Bolts: The Contractor shall protect buried bolts against corrosion with approved paint or by polyethylene wrapping.
4.5	**BEDDING, SURROUND, HAUNCHING, ENCASEMENT AND THRUST BLOCKS**
4.5.1	***GENERAL***
4.5.1.A	Scope: A.1 Pipe bedding, surround and ways of securing pipe installations are specified in this section.
4.5.2	***MATERIALS***
4.5.2.A	: Pipe bedding and/or surround, and filling materials under and around pipes shall comply with the appropriate requirements of Section 2.04.
4.5.2.B	: All concrete work shall comply with the appropriate requirements of Division 5.
4.5.2.C	: Concrete bedding shall be Class C16/20.
4.5.2.D	: Concrete for encasements, thrust blocks, arches and haunches shall be Class C20/25.
4.5.2.E	: Compressible board shall be 20mm thick fibrous material or similar approved material.
4.5.3	***WORKMANSHIP***

Clause No.	CLAUSE
	Placing Concrete: A.1 After placing pipe the Contractor shall pour concrete in trench and thoroughly work under pipe to provide solid and uniform bedding.
4.5.3.A	A.2 After pipe joint is completed the Contractor shall place the balance of concrete or haunching and work into place on both sides simultaneously.
	A.3 The Contractor shall form vertical construction joints in concrete beds, surrounds etc. at the face of pipe joints with compressible board and finish to profile of the concrete and pipe. The Contractor shall fill any gap between spigot and socket with approved resilient material.
4.5.3.B	Placing Material Other than Concrete: B.1 The Contractor shall place surround or bedding material in bottom of prepared trench and carefully hand tamp to minimum thicknesses. B.2 After pipe has been laid the Contractor shall place additional material or haunching in successive layers not exceeding 150 mm thick on both sides simultaneously and completely fill spaces between pipe and side of trench and carefully hand tamp without disturbing the pipe.
4.5.3.C	Thrust Blocks: C.1 Thrust blocks shall be provided at bends and other fittings on pressure pipelines. Additional excavation shall be made as required after pipeline has been jointed. No pressure is to be applied to the thrust block until concrete has matured for at least 3 days.
4.6	**MANHOLES, CHAMBERS INLETS AND GULLIES**
4.6.1	***GENERAL***
4.6.1.A	Scope:
4.6.2	***MATERIALS***
4.6.2.A	: Excavation and backfilling generally shall comply with the appropriate requirements of Division 2 of the Specification: SPECIFICATIONS – VOLUME 2 EARTHWORKS
4.6.2.B	: Concrete work generally shall co mply with the appropriate requirements of Division 5 of the Specification: DETAIL DESIGN REPORT SPECIFICATIONS – VOLUME 5 CONCRETE AND STEEL WORKS
4.6.2.C	: Reinforcement shall conform to the requirements as specified in Section 5.3 "Steel Reinforcement and Fixing".
4.6.2.D	: Precast units to BS EN 1917:2002 and BS 5911-3:2002. Thickness shall be as indicated on the Drawings. Concrete shall be Class C25/30 EN206. Cement shall be ordinary Portland cement to BS EN 197-1.
4.6.2.E	: Plain and reinforced concrete for cast In-Situ units shall be Class 20/25 and 30/35 (EN206) respectively. Cement shall be ordinary Portland cement to BS EN 197-1 type CEMI or ASTM C150/C150M Type 1.
4.6.2.F	: F. Coatings shall be as specified in A5 and A6 of section 4.6.3.
4.6.2.G	: Bricks shall be to BS EN 771-1. Net volume of clay masonry units shall be determined according to BS EN 772-3. Water absorption of clay masonry shall be determined according to BS EN 772-7.
4.6.2.H	: Covers and frames shall be non-rocking, locking, epoxy coated, solid top to BS EN 124. Wording on cover shall indicate nature of network (water supply, sewage, storm water, etc.…). Grades shall be as follows: - In Roadways: Heavy duty test load 40 tons - In Sidewalks, Carriage Drive and Cycle Tracks: Medium duty test load 25 tons - In Footpaths and Fields: Light duty, test load 7 tons
4.6.2.I	: Manhole covers shall be of circular pattern unless otherwise indicated on Drawings. Frames shall be provided with opening for fixing bolts, which ensure solid frame embedment into manhole concrete neck. Covers and frames shall be coated to BS 3416. Minimum thickness 250 microns.
4.6.2.J	: Road gully gratings shall be non-rocking to BS EN 124, coated to BS 3416. Minimum thickness 250 microns. Types to be as follows: - For Carriageways: Minimum test load 40 tons. - For Footpath, Cycle Tracks and Fields: Light duty, test load 7 tons.
4.6.2.K	: Step irons shall be to BS EN 13101: PT1
4.6.2.L	: GRP ladders of an approved pattern as specified may be purpose made to suit the depth of each manhole and chamber. Fixings for ladders shall be approved stainless steel stud anchors. Fixings holes shall be grouted with epoxy mortar and sealed as above. Rungs or treads shall be ribbed to provide a non-slip surface.
4.6.2.M	: Safety chains shall be 8 mm nominal size stainless steel grade 316.
4.6.2.N	: Guard railing shall be tubular, mild steel, medium grade to BS EN 10255 with welded joints, galvanized to BS EN ISO 1461 with 610 grams of zinc per square meter.
4.6.2.O	: Fixing bolts shall be steel, type suitable for particular purpose and use and to approval. When used to fix galvanized material, washers are to be galvanized and fixing bolts and nuts cut to pre-plating limits and electroplated with zinc to BS EN ISO 2081.

Clause No.	CLAUSE
4.6.2.P	: Steel castings shall be mild to medium strength castings and shall conform to AASHTO M103M/M103. Unless otherwise shown on the Drawings or instructed by the Engineer, castings shall be grade 65-35 fully annealed. Steel castings shall conform to the dimensions shown on the Drawings. Test bars shall be prepared and tested as specified in AASHTO M103M/M103.
4.6.2.Q	: The Contractor shall submit to the Engineer all specified test coupons and Manufacturers' Certificates of Guarantee for all structural steel, cast iron, ductile iron, cast steel and wrought iron parts stating that the materials supplied meet the appropriate AASHTO or ASTM specification. The submission of such test certificates shall not relieve the Contractor of his obligations to carry out independent tests at an approved laboratory, as directed by the Engineer, at his own expense.
4.6.3	***CONSTRUCTION AND INSTALLATION*** Manholes and Inspection Chambers: A.1 Construction: In situ concrete or precast concrete as indicated on Drawings or as proposed by Contractor. In-situ units shall comply with the provisions of the specifications volume 5: DETAIL DESIGN REPORT SPECIFICATIONS – VOLUME 5 CONCRETE AND STEEL WORKS A.2 Precast units shall be cast in steel watertight forms at least 3 weeks before sections are used. Lowest unit shall be bedded on in situ concrete base and bed and haunch in cement mortar. Joints of units shall be liberally coated with approved bituminous material of trowelling grade prior to fixing. Joints shall be filled solid and neatly stroked off surplus compound. Work shall remain undisturbed for 7 days thereafter. Alternatively, joints may be sealed with approved preformed jointing strip in accordance with manufacturer's instructions. The precast concrete cover slab shall be bedded in cement mortar on the top unit. A.3 Channels in bottom of manhole shall be smooth, semi-circular and sized equal to diameter of adjacent sewers. For straight through manholes, channels of half pipe sections shall be installed. Changes in direction of flow shall be made with smooth curves as large as manholes permit. Changes in size and grade of channels shall be gradual and even.
4.6.3.A	A.4 Benching shall be formed with sulphate resisting concrete Class C25/30 to rise vertically from top of channels to a height not less than soffit of outlet pipe, then it shall be sloped upwards 1 in 10 to walls. Floating shall then be carried out within 3 hours with a coat of sulphate resisting cement-sand mortar 1:2. Smooth finishing shall then be accomplished with a steel trowel. A.5 External (buried) surfaces Manholes and chambers shall be protected with water- proof membrane with protection board as indicated in the drawing and as specified in SPECIFICATIONS – VOLUME 5 CONCRETE AND STEEL WORKS. A.6 Internal faces of manholes and chambers shall be protected with a reinforced plastic liner at least 6.5 mm thick to all internal faces. GRP lined manholes and chambers shall be constructed in accordance with the Drawings and shall incorporate a GRP lining A.7 Step irons shall be cast into precast units or grouted into preformed mortices. Step irons shall not be used as lifting eyes. Devices for lifting and handling are to be provided on exterior faces. A.8 Adjustment of level shall be accomplished with top courses of brickwork or concrete rings after completion of surrounding levels. Final levels shall be even and accurate. A.9 Frames for covers and gratings shall be solidly bedded in mortar and fixed firmly using fixing bolts. Position centrally over

Clause No.	CLAUSE
4.6.3.B	Valve Chambers: B.1 Construction shall be in situ concrete, precast concrete or blockwork as indicated on the Drawings. B.2 When masonry is used in lieu of concrete for square or rectangular structures, the inside dimensions of the structure shall be of the dimensions shown on the Drawings unless ordered otherwise by the Engineer. The mortar for masonry shall be as specified in Section 5.1 of the Specifications: DETAIL DESIGN REPORT SPECIFICATIONS – VOLUME 5 CONCRETE AND STEEL WORKS "Concrete and Concrete Mixes and Testing ". The brick or concrete block shall be laid with full mortared joints and with sufficient header courses to tie the masonry together properly as approved by the Engineer. B.3 External coating shall consist of two coats of asphaltic composition applied by brush in accordance with manufacturer's instructions. Minimum thickness shall be 400 microns. B.4 The covers frame shall be set solidly in mortar and fix firmly using fixing bolts. The Contractor shall position the cover centrally over the opening and level and square with surrounding finishes and set cover in position to prevent twisting.
4.6.3.C	Inlets and Gullies: C.1 Construction shall be in situ concrete, precast concrete or blockwork as indicated on the Drawings C.2 When masonry is used in lieu of concrete for square or rectangular structures, the inside dimensions of the structure shall be of the dimensions shown on the Drawings unless ordered otherwise by the Engineer. The mortar for masonry shall be as specified in Section 5.1 of the Specifications: DETAIL DESIGN REPORT SPECIFICATIONS – VOLUME 5 CONCRETE AND STEEL WORKS "Concrete and Concrete Mixes and Testing ". The brick or concrete block shall be laid with full mortared joints and with sufficient header courses to tie the masonry together properly as approved by the Engineer. C.3 Castings shall be set in full mortar beds or otherwise secured as shown on the Drawings and approved by the Engineer. Mortar for setting castings shall be mixed as specified in Section 5.1 of the Specifications: DETAIL DESIGN REPORT SPECIFICATIONS – VOLUME 5 CONCRETE AND STEEL WORKS "Concrete and Concrete Mixes and Testing". Castings shall be set accurately to correct elevation so that no subsequent adjustment is necessary.
4.6.3.D	Cleaning: D.1 All chambers, catch basins, catch pits, manholes, inlets and outlets shall be thoroughly cleaned of any accumulations of silt, debris or foreign matter of any kind, and shall be free from such accumulations at the time of final inspection.
4.6.3.E	Coating: E.1 Structural steel cover plates shall be coated with two coats of coal tar epoxy 250 microns dry film thickness.
5	**CONCRETE & STEEL WORKS**
5.1	**CONCRETE AND CONCRETE MIXES AND TESTING**
5.1.1	***GENERAL***

Clause No.	CLAUSE
	Design Standard and Classes of Concrete: A.1 DESIGN of reinforced concrete work has been based on the following standards: design : Eurocode 2, EN 1992 design loads : Eurocode 1, EN 1991 wind and thermal actions : Eurocode 1, EN 1991-1-4 earthquake design : Eurocode 8, EN 1998 A2 CLASSES OF CONCRETE: perform tests in accordance with EN 206-1: * The substructure concrete mix shall include materials as silica fume, in combination with fly ash or GGBS, as necessary, or materials able to meet the specified permeability requirements for "Very Low" permeable concrete. A.3 ABSORPTION AND PERMEABILITY SUSBSTRUCTURE REINFORCED CONCRETE MIXES: 1. Absorption Test: The absorption of the concrete from the trial mixes and from the hardened cast concrete for structural grades shall be tested as a measure of the concrete's ability to resist the ingress of aggressive salts. No absorption tests shall be required for blinding or mudmat concrete. Absorption tests shall be in accordance with modified BS 1881: Part 122 as follows:
5.1.1.A	— After trial mixes have been accepted, three 150 mm cylinders shall be cast from each grade of concrete and immersed in water at 20 deg. C for 7 days. — At the end of the curing period, 75 mm diameter core specimens shall be cut along the longitudinal axis of each cylinder to a depth of 75 mm. — The specimens shall be dried in an oven at 105 deg. C for 72 hours. — The specimens shall be cooled in a dry airtight vessel for 24 hours, weighed, and then immediately immersed in a tank containing water at 20 deg. C with the longitudinal axis of the cores horizontal, and with 25 mm depth of water over the specimens — The specimens shall be immersed for 24 hours, then removed, shaken, surface dried, and reweighed. The water absorption shall be calculated as the increase in mass resulting from immersion, expressed as a percentage of the dry mass — If the cores lengths differ from 75 mm, a correction factor (graph given in BS 1881) shall be applied. — The mean of the corrected absorption figure for each concrete grade shall be calculated and the absorption of the concrete mixes shall be acceptable if the mean absorption is less than 1.6 percent at 30 minutes for substructure concrete. The mean absorption figure and the lowest absorption figure shall be recorded for each grade and used for comparison purposes with absorption tests carried out on cores cut from in-situ concrete. 2. BS EN 12390-8 Depth of Penetration shall be carried out as a measure of water permeability of concrete before the mix design or manufacturing method are approved. The tests shall be carried out in accordance with BS EN 12390-8 at age 28 days and the
5.1.2	***MATERIALS AND PRODUCTS***

Clause No.	CLAUSE
	Aggregates, Cement, Water and Admixers: A.1 CONSTITUENT MATERIALS GENERALLY: to BS EN 12620, BS 8500-1, BS 8500-2, BS EN 206-1 and to the requirements of Section E11:2 of this Specification. A.2 SOURCES OF AGGREGATES: provide details of proposed sources of aggregates for approval. A.3 EXPOSED AGGREGATE: obtain each type of aggregate which will be exposed in finished concrete work from one source and ensure adequate supplies can be maintained throughout the work. A.4 COARSE AGGREGATES: to BS EN 12620, from natural sources. Maximum size of aggregate in any member shall not be larger than 32 mm, in addition it shall not be larger than: 1/5 narrowest dimension between forms 1/3 depth of slabs 3/4 minimum clear spacing between reinforcing bars. These limitations may be waived if, in the opinion of the Engineer, workability and methods of consolidation are such that concrete can be placed without honeycomb or void. A.5 FINE AGGREGATES: to BS EN 12620, from natural sources. A.6 LIGHTWEIGHT AGGREGATE: foamed or expanded blastfurnace slag to BS EN 13055-1. A.7 PLUMS FOR CYCLOPEAN CONCRETE: broken stone spalls or boulders free from sharp or angular edges and ranging in size from 100 to 300 mm.
5.1.2.A	A.8 CEMENTS: obtain from approved sources. Delivery of cement is to be in sealed and branded containers in batches not exceeding 100 tonnes or in purpose made bulk delivery vehicles. A.9 ORDINARY PORTLAND CEMENT: to BS EN 197-1 Type CEM I 42.5N. The C3A content for the cement that will be used in reinforced substructure concrete elements shall range from 5% to 8%. A.10 SULPHATE RESISTING PORTLAND CEMENT: to BS EN 197-1 Type CEM I 42.5N-SR with C3A content lower than 5% shall be used in plain substructure and blinding concrete and for concrete in contact with sewage. A.11 HIGH ALUMINA CEMENT: do not use. A.12 ADMIXTURES: To be used as directed and approved by the Engineer. A.13 SILICA FUME: Silica fume (SF) used as a cement replacement shall be in accordance with BS EN 13263-1, amorphous silica. There shall be 5 - 10 percent replacement of the cementitious weight. The silica fume shall be obtained from an approved supplier. A.14 Cementitious additives such as Ground Granulated Blast-Furnace Slag up to 65% or fly ash up to 35% of the cementitious weight, in combination with Microsilica 5% to 10% of the cementitious weight, shall be added to the concrete mix, as necessary. Blending of slag or Fly ash with Portland cement is accomplished at mixing plant. These materials are added to slow rate of concrete strengthening and lower heat of hydration. 1- Ground Granulated Blast-Fumace Slag: BS EN 15167-1, (50% to 70% replacement of cementitious weight) 2- Fly Ash: BS EN 450 (25% maximum replacement of cementitious weight)
5.1.3	***WORKMANSHIP***
5.1.3.A	General: A.1 CODE OF PRACTICE: concrete work is to be in compliance with the requirements of BS EN 1992-1-1. A.2 STANDARDS: composition of mixes, production of concrete and information to be provided are to be as specified and to BS 8500-1, BS 8500- 2, BS EN 206-1 unless otherwise specified. A.3 STORE DIFFERENT AGGREGATES SEPARATELY on hard paved self-drained areas or in suitable hoppers or containers. A.4 STORE CEMENT dry in weathertight structures with raised floors or in suitable silos. Store different types and consignments of bagged cement separately and use in order of delivery. A.5 DO NOT USE cement manufactured more than six months prior to proposed use on the site.

Clause No.	CLAUSE
5.1.3.B	Testing and Approval of Constituent Materials: B.1 PRELIMINARY TESTS AND SAMPLES: unless otherwise specified samples and tests are to be submitted or carried out and approval obtained before making concrete for use in the work. B.2 SAMPLES OF NATURAL AGGREGATES: submit preliminary samples of aggregates proposed for concrete work, to BS EN 932-1. B.3 PRELIMINARY TESTS ON NATURAL AGGREGATES: carry out preliminary tests to BS EN 12620, BS EN 1367-4, and BS EN 932-5 for: sieve analysis clay, silt and fine dust specific gravity water absorption bulk density, voids and bulking moisture content organic impurities aggregate impact value aggregate crushing value 10% fines value crushing strength aggregate abrasion value chemical properties (soluble salt contents). Carry out tests on every consignment from a new source and additional tests required by the Engineer. B.4 ALKALI AGGREGATE REACTIVITY TESTS: where aggregates are obtained from a previously unknown source, carry out the following additional tests as and when instructed by the Engineer: petrographic examination to EN 932-3 concrete prism test to BS 812-123 B.5 WORKS TESTS ON NATURAL AGGREGATES: during the progress of the work carry out tests to the relevant BS EN standard test methods of all quality tests included under BS EN 12620 and for all items listed in Clause B.3. B.6 TEST CERTIFICATES FOR CEMENT: provide manufacturers' test certificates and obtain approval before starting trial mixes. Obtain manufacturer's test certificates for each consignment brought to the site during the progress of the work and retain on the site. B.7 TESTS ON CEMENT: representative samples from a minimum of ten bags from each batch are to be obtained and tested by methods prescribed for compliance with BS EN 197-1 or BS 4027 depending upon the type of cement. Batches and consignments that fail required cement quality tests are not to be used in the work and are to be removed from the site

Clause No.	CLAUSE
5.1.3.C	DESIGN, BATCHING AND MIXING : C.1 DESIGN concrete mixes to the requirements of BS 5328. C.2 EVIDENCE OF SUITABILITY: for each mix submit in writing details of: proposed quantities of cach ingredient per cubic metre of compacted concrete evidence to show that proposed constituent materials and method of manufacture will produce concrete of required quality. C.3 TRIAL MIXES are to be prepared for testing and approval one month prior to commencing concreting. C.4 APPROVAL: do not use mixes before submitted information and evidence has been approved. Such approval will not prejudice the requirement that mixes are to comply with the Specification. C.5 MAKE ADJUSTMENTS to percentage of fine aggregate to allow for: fineness zone of material workability requirements bulking of damp sand if measuring by volume. C.6 ENRICHMENT OF MIX: subject to approval the aggregate/cement ratio may be reduced by up to 10% for first layer of concrete in walls. Do not alter water/cement ratio. C.7 CONTROL OF COLOUR: obtain approval before altering proportions or grading of concrete exposed in finished work. C.8 ADMIXTURES: if approved use strictly in accordance with the manufacturer's instructions. C.9 RETARDING WATER REDUCING ADMIXTURES may be used in large volumes of concrete subject to approval and are to be used when instructed by the Engineer. C.10 RETARDING ADMIXTURES may be used in large volumes of concrete subject to approval and are to be used when instructed by the Engineer. C.11 WATER REDUCING ADMIXTURE (PLASTICISER): to be used in the production of all reinforced concrete unless otherwise specified. C.12 CHLORIDE ION CONTENT IN ADMIXTURES: The admixture shall be free of chlorides that mat adversely affect the performance of concrete. C.13 TOTAL CHLORIDE CONTENT IN CONCRETE MIX arising from aggregates, water, cement, admixtures and other sources is not to exceed 0.15 percentage of chloride ion to cement by weight. C.14 TOTAL SULPHATE CONTENT IN CONCRETE MIX arising from constituents and other sources is not to exceed the lesser of 0.4% by weight of aggregates or 4.0% by weight of cement in mix. C.15 READY MIXED CONCRETE: concrete mixed outside the site and transported to it is to be batched and mixed in accordance with the requirements of BS 8500-1, BS 8500-2, BS EN 206-1. C.16 CYCLOPEAN CONCRETE: soak plums in water prior to incorporation into Class C concrete. Plums are to be evenly placed and comprise maximum 50% of total volume of concrete in position and with minimum cover of 70 mm.

Clause No.	CLAUSE
5.1.3.D	TESTING CONCRETE: D.1. GENERALLY: sampling, testing and assessment of compliance are to be as specified and to BS EN 206-1, BS 8500 or to BS EN 12390 unless otherwise specified or approved. D.2. COMPLIANCE TESTING: testing and checking are to be in the presence of or as agreed with the Engineer. Submit results to the Engineer within 2 working days of completion of each test. D.3. TESTING AUTHORITY: testing may be carried out by an independent testing authority subject to approval. D.4. ATMOSPHERIC THERMOMETER: provide maximum and minimum thermometer in approved position on the site for measuring atmospheric shade temperature. D.5. SOIL THERMOMETER: provide soil thermometer for measuring concrete and ground temperatures. D.6. TEST APPARATUS: keep in good repair until concrete work is completed. D.7. SAMPLES: to ensure adequate quality control of mixes on the site take samples of each mix of concrete from every mixing point in accordance with the recommendations and the requirements of BS EN 12350-1, BS EN 12504, or BS EN 12390. D.8. SAMPLING RATE: take samples for compliance testing of compressive strength for each mix as follows: — initially 4 random samples during cach of the first 10 days of using mix — thereafter not less than one sample during each day of using mix. — unless otherwisc approved each sample is to represent a volume of not more than 20 m®. Higher rates of sampling and testing may be instructed at: start of work to establish level of quality, during periods of production when quality may be in doubt or during the pouring of column, cantilever and other critical elements. Subject to approval sampling rates may be reduced when high and consistent quality has been established. D.9. WATER/CEMENT RATIO: where works slump testing is specified for assessing compliance with specified free-water/cement ratio, submit results of preliminary tests to establish relationship between the two properties and obtain approval. D.10. SLUMP TESTS: carry out in accordance with BS EN 12350-2 at required times and when test cubes are prepared. D.11. COMPRESSIVE STRENGTH TESTING: a minimum of six test cubes if approved are to be made for cach sample. Test three at 7 days and three or more at 28 days. The strength at 28 days must not be less than the compressive strength specified for the relevant class of concrete in Clause A2, D.12. PERMEABILITY TESTING: test cubes at 28-days, as approved by the Engineer on site, shall be collected from the hardened concrete for permeability testing specified under Clause A 3. D.13. RECORDS: indicate on works test records parts of structure represented by samples tested. Keep records on the site. D.14. FAILURE OF CONCRETE MIX: if concrete mix fails to achieve specified criteria or to pass specificd tests arrange for design of mixes to be adjusted and tests repeated until mixes are accepted by the Engineer. D.15. FAILURE OF CONCRETE WORK: if workmanship and finished work are not in accordance with specified requirements then the Engineer may require testing of drilled cores and/or loading tests to be carried out on any part of the structure after completion. The Contractor is to arrange for an approved independent testing authority to carry out such required tests. The costs of all such tests and testing shall be borne by the Contractor.
5.2	**COCRETE HANDLING,PLACING AND CURING**
5.2.1	***GENERAL***
5.2.1.A	CONCRETE GENERALLY: : A1. CONCRETE GENERALLY: constituent materials, composition of mixes, production, information to be provided, sampling, testing and compliance are to be in accordance with Section 5.01 of the Specification.
5.2.2	***MATERIALS AND PRODUCTS***
5.2.2.A	CURING COMPOUNDS: CURING COMPOUND: is to be an approved liquid membrane forming compound to BS 7542, applied at a rate, in strict accordance with manufacturer instructions, to restrict moisture loss to not more than 0.55 kg/m2 in 72 hours.
5.2.3	***WORKMANSHIP***

Clause No.	CLAUSE
5.2.3.A	GENERALLY: A.1. LARGE AREAS: submit drawings showing bay sizes and sequence of casting large areas. Plan bay sizes to avoid cracking due to thermal and shrinkage stresses. A.2. POUR RECORDS: record, in an approved form, details of every pour of concrete placed in the permanent works including: — class of concrete, — location and date of pour, — ambient temperature and concrete temperature at time of placing, — moisture content of aggregates, — details of mixes, batch numbers and cement batch number, — results of tests, — location of sample points for test cylinders or test cubes if approved, — details of cores. A.3. WEEKLY RECORDS: provide four copies of records each week covering work carried out the preceding week. A.4. MONTHLY RECORDS: provide monthly histograms of all 28 day cylinder/cube strengths and both monthly and accumulative standard deviations and other information which the Engineer may require concerning concrete placed in the permanent works. A.5. TRANSPORT: concrete to avoid contamination, segregation or loss of ingredients. A.6. CLEAN: transporting equipment immediately after use or whenever cement or aggregate is changed. Remove free water.
5.2.3.B	PREPARATIONS OF SURFACES: B.1. CLEANING: at time of placing ensure surfaces on which concrete is to be placed are clean with no debris or free water. B.2. INSPECTION: inform the Engineer not less than 24 hours before cach pour of concrete to allow inspection of reinforcement and surfaces on which concrete is to be placed.
5.2.3.C	PLACING AND COMPACTING: C.1. TRAFFIC: use suitable stools, walkways and barrow runs for traffic over reinforcement or freshly placed concrete. C.2. TIMING: time elapsing between mixing and placing is to be as short as practicable and in no case longer than 30 minutes for site mixed concrete and 50 minutes for ready mixed concrete. C.3. PLACING: do not discharge concrete through reinforcement or other obstructions to cause uneven dispersal, segregation or loss of ingredients. Use suitable chutes or trunking to place concrete where reinforcement is congested. Design of chutes or other means of placing is to be submitted for approval. Height of any drop of concrete is not to exceed 2 m. Place concrete in final position in one continuous operation up to movement and construction joints. C.4. CASTING BAYS: allow not less than 48 hours between casting of adjacent bays separated by construction joints or formed contraction joints. C.5. EXPANSION JOINTS: do not place concrete on both sides of joint at same time unless otherwise approved. C.6. REINSTATE REINFORCEMENT: displaced during placing of concrete. C.7. HOT AND ADVERSE WEATHER: do not place concrete: ~ when ambient shade air temperature exceeds 43 deg. C, — during rain, snow or heavy sand storms. C.8. HOT WEATHER: when ambient shade air temperature exceeds 32 deg. C conform with the general requirements of ACI 305R. When ambient shade air temperature is 37 deg. C and rising adopt special procedures during concreting operations to ensure that the concrete temperature when placed does not exceed 35 deg. C. As a minimum:mixing water: cool to a temperature between 0 deg. C and 15 deg. C by adding ice to the water tank or using a chilled water system. The addition of ice directly to the concrete mix shall be allowed as directed by the Engineer. — aggregates: store under shade and protect from direct sunlight, cool by water sprinkling — formwork and reinforcement: protect from direct sunlight prior to concreting — transit mixers: wrap and secure thermal insulation around drums to avoid over heating of drum metal and excessive heat transfer. C.9. COMPACT CONCRETE: by mechanical vibration, unless otherwise approved, to full depth of fresh concrete to ensure full compaction and amalgamation with previous batches. Do not damage adjacent partly hardened concrete. Compact concrete thoroughly around reinforcement, duct formers, inserts and into corners of formwork. C.10. VIBRATORS: except where otherwise agreed by the Engineer, are to be immersion vibrators of adequate size and power operating at a frequency of not less than 6000 cycles per minute. Inform the Engincer of the number and type of vibrators to be used. Maintain vibrators in good working order, use trained and experienced operators and provide standby vibrators. Do not use external vibrators without approval.

Clause No.	CLAUSE
5.2.3.D	CURING AND PROTECTING: D.1. CURING: as soon as concrete has set or immediately after striking formwork cover surfaces of concrete as specified. Keep surfaces of concrete continuously covered for not less than 7 days. D.2. METHOD OF COVERING: is to be approved and is not to disfigure permanently exposed surfaces or affect satisfactory bond of subsequent coatings. Method of covering, subject to other requirements, is to be by: — retaining forms in position, — impervious sheet materials, — absorbent materials, kept damp, — application of curing compound. When covering with shect materials ensure edges are secured throughout specified curing period to prevent draughts passing over surfaces of concrete. D.3. HOT WEATHER: keep newly placed concrete continuously wet for a minimum of fourteen days. Keep curing and protective surface covering continuously saturated with water. Fog spray of water or cover with appropriate material should be used over freshly laid horizontal members, such as slabs to prevent plastic shrinkage. D.4. PROTECTION: prevent damage to concrete as follows: — surfaces generally from rain, wind and sun, indentation and physical damage, — surfaces exposed in finished work from rust marks and other disfigurements, — immature concrete from physical shock or movement, — immature concrete from thermal shock, particularly from cold water.
5.2.3.E	TESTING OF CONCRETE WATER RETAINING STRUCTURES: E.1. GENERAL: Testing of concrete water retaining structures, for water tightness, shall be based on the requirements of ACI 350.1-01. Testing shall be performed after completion of the structure, installation of fittings and accessories, but before the application of internal waterproofing, and before any backfilling behind the structure's walls has taken place. E.2. ALL TANK PENETRATIONS AND OUTLETS: shall be securely sealed to prevent loss of water from the tank during the test. Tank penetrations and outlets shall be monitored before and during the test and shall be repaired from leakage (if any) prior to taking test measurements. E.3. RATE OF INITIAL FILLING: of a new tank should not exceed 1.2m/hr (of the tank height).Tank filling shall be continued until the water surface is at the design maximum water level or 100 mm below any fixed overflow level, whichever is lower. E.4. TEST MEASUREMENTS: shall be recorded at 24 hr intervals. The test period shall be at least the theoretical time required to record a drop in the water surface of 10 mm, which is, according to the acceptance criterion, ( ) days, rounded up, where h is the water depth in (mm). Test period need not exceed five consecutive days. E.5. THE CHANGE IN WATER VOLUME: in the structure shall be calculated and corrected, if necessary for evaporation, precipitation and temperature. If loss exceeds the required criterion, the structure shall be considered to have failed the test. The structure shall also be considered to have failed the test if observed flowing or seeping from the structure or if moisture can be transferred from exterior surface to a dry hand. The structure shall not be considered to have failed the acceptance criterion if dampness or wetness on top of a footing, in the absence of flowing water, is observed. E.6. ACCEPTANCE CRITERION AND PERFORMANCE OF TEST shall be in accordance with the requirements of ACI 350.1, standard criterion HST-050, which requires that the drop in the water surface not exceed 0.05% in 24 hours. E.7. RETESTING SHALL BE PERMITTED: if the first test fails to satisfy the criterion. Second test may be performed immediately following the first test, provided that no visible leakage is exhibited. If the tank fails the second test or if it was not tested immediately after the first test failure, the tank shall only be retested after probable areas of leakage have been detected and repaired. Tanks shall be retested until they meet the required criterion.
5.3	**STEEL REINFORCEMENT AND FIXING**
5.3.1	***PRODUCTS***

Clause No.	CLAUSE
5.3.1.A	BARS: A.1. HOT ROLLED MILD STEEL BARS: to BS 4449 Grade 250. A.2. DEFORMED HIGH YIELD STEEL BARS: to BS 4449 Grade 500B. A.3. CERTIFICATES AND DETAILS: provide with each delivery of bar reinforcement: certificates of origin and of compliance with appropriate standard including the bend and rebend tests delivery note giving details of each consignment. A.4. TEST RECORDS: provide manufacturer's test records demonstrating compliance with and frequency of testing in accordance with appropriate standard. Records of test results are to include: tensile strength 0.2% proof stress for bars to BS 4449 and for steel wires to BS 4482 yield stress of bars to BS 4449 percentage elongation and gauge length cold bend test rebend test size of effective cross-scctional area of bar or steel wire ladle analysis of steel showing chemical composition. A.5. TEST PIECES: when tests verifying compliance with appropriate standard are required deliver test pieces selected by the Engineer to an approved independent laboratory. A.6. INDEPENDENT LABORATORY RESULTS will overrule results given in manufacturer's certificates and the Contractor's test records. Failure of test pieces to comply with the Specification will result in the rejection of correlative bar deliveries from which they were selected. A.7. TAG clearly bundles of reinforcement with bar mark references.
5.3.1.B	ACCESSORIES: B.1. BAR SUPPORTS, bolsters, chairs, spacers and other devices for spacing, supporting and fastening bar and mesh reinforcement in place are to be steel wire, plastic or precast concrete of greater compressive strength than poured concrete and generally complying with CRSI DA4 "Manual of Standard Practice". B.2. BAR SUPPORTS and cover spacers in contact with forms for concrete surfaces which will be exposed are to be plastic or plastic coated. Use of precast concrete is not permitted. B.3. COVER SPACERS: proprietary pattern to approval. Man: Betomax Kunsthoff und Metalwarenfabrik GmbH & Co. Man: Elameen for Plastic or other equal and approved. B.4. TYING WIRE: 1.6 mm (16 swg) annealed iron wire. B.5. SCREWED COUPLERS: Mechanical splices for deformed high yield steel bars preferably for bar diameter 32mm and above, are to consist of two scamless steel sleeves and interconnecting high tensile steel stud with plastic protection caps for threaded section of sleeve. Couplers shall be isometric parallel-threaded type with no reduction of cross section area of the bar. The resulting connection shall not reduce the ductility of the parent bar and should be able to develop the full tensile capacity of the parent bar. Heating of the reinforcement bars is prohibited. Only manufacturers that hold a valid CARES and ISO 9001 certification from an agency that is specialized on reinforcement materials shall be considered as suppliers, full trace ability is required. Couplers to be tested and the test to exceed 135% min. of the specified yield strength of steel rebars. Man: Ancon Building Product Man: Screwed Couplers Ref: Dextra Bartec or other equal and approved.
5.3.2	***WORKMANSHIP***
5.3.2.A	GENERALLY: A.1. REJECT consignments of reinforcement showing signs of fracture. A.2. STORE reinforcement clear of ground and prevent contamination by other materials. A.3. PROTECT reinforcement from corrosive effects of humidity, water and dust. A.4. OBTAIN APPROVAL of fixed reinforcement before concrete is placed. Notwithstanding approval by the Engineer correct placing and fixing of reinforcement are the Contractor's responsibility. A.5. CLEANLINESS: at time of placing concrete the reinforcement is to be clean and free from corrosive pitting, loose mill scale, loose rust, ice, oil and other substances adversely affecting reinforcement, concrete or bond between the two.
5.3.2.B	CUTTING AND BENDING: B.1. CUTTING AND BENDING SCHEDULES will not be provided. Provide interim detailing necessary to cut and bend reinforcement unless otherwise instructed. Prepare bar bending schedules in accordance with BS 8666 and submit in duplicate to the Engineer at least four weeks prior to placing reinforcement. B.2. BENDING: bend bars cold on approved machines. Do not rebend bars without approval. Hot bend only with approval. Bend bars to shapes shown on the schedule within dimensional tolerances given in BS 8666. Reduce amount of bending at temperatures below 5 deg. C to prevent fracture of steel. B.3. IDENTIFICATION: tie bars together in bundles or groups and legibly label in accordance with BS 8666. B.4. ADJUSTMENTS: provide facilities for hand bending on the site for approved minor adjustments. B.5. PROJECTING REINFORCEMENT: do not bend without approval.

Clause No.	CLAUSE
	FIXING: C.1. TOLERANCES: fix reinforcement in position within the following tolerances: +/-10 mm for ties and stirrups in any direction parallel to a concrete face +/-40 mm for longitudinal location of bends and ends of bars at continuous ends +/-10 mm for longitudinal location of bends and ends of bars at discontinuous ends. C.2. LAPS OR SPLICES: obtain instructions if details are not provided. C.3. ELECTROLYTIC ACTION: do not fix or place reinforcement in contact with non- ferrous metals. C.4. SECURE reinforcement with tying wire or approved steel clips. Bend wire well back clear of forms. C.5. TACK WELDING: do not tack weld.
5.3.2.C	C.6. COVER: to be not less than nominal cover shown on the Drawings. Actual concrete cover for reinforcement located in relation to only one face of member (¢.g. straight bar in slab) is to be not more than required nominal cover plus: 5 mm on bars not exceeding 12 mm diameter 10 mm on bars over 12 mm and not exceeding 25 mm diameter 15 mm on bars over 25 mm diameter. C.7. BAR SUPPORTS: provide as necessary to space, support and fasten reinforcement in position and agree quantity and arrangement with the Engineer. Fix chairs at 1 m centres to support top reinforcement in slabs unless detailed otherwise. Fix spacers at 1 m centres between wall reinforcement unless detailed otherwise. C.8. COVER SPACERS: obtain approval of type, size and position. C.9. DO NOT insert bars into placed concrete. C.10. FORMS AND FORM LININGS: do not damage when fixing reinforcement.
5.3.2.D	JOINTING: D.1. STRUCTURAL WELDED JOINTS: not permitted. D.2. MECHANICAL SPLICES: do not use unless approved. D.3. MECHANICAL SPLICES: on enquiries and orders state the standard of deformed bars to which screwed couplers are to be swaged. Carry out swaging under the supervision of and in accordance with manufacturer's instructions using a press supplied by him.
5.4	**FORMS, FORMWORK AND FALSEWORK**
5.4.1	***PRODUCTS***
5.4.1.A	FORM TIES: A.1. FORM TIES: approved factory fabricated, adjustable length, removable or snap-off metal form ties designed to prevent form deflection and prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 50 mm to plane of exposed concrete surface.
5.4.1.B	RELEASE AGENTS AND SURFACE RETARDERS: B.1. RELEASE AGENTS: non-staining, effective after exposure to high temperature, sun and wind. B.2. SURFACE RETARDERS: liquid application to retard set of surface mortar to controlled appropriate depth.
5.4.2	***WORKMANSHIP***

Clause No.	CLAUSE
5.4.2.A	DESIGN AND CONSTRUCTION: A.1. GENERALLY: provide formwork to produce finished concrete work to required dimensions and finishes. A.2. DETAILS: provide details of forms as follows: positions and types of construction joints layout of panel joints where exposed to view layout of form tie holes where exposed to view means of sealing panel joints, form tie holes and at construction joints surface of forms and other means of obtaining required finish access openings. A.3. SLOPING UPPER SURFACES OF CONCRETE exceeding 30 deg. are to be constructed against formwork. Upper surfaces sloping between 20 and 30 deg. are also to be constructed against formwork unless it can be demonstrated to the satisfaction of the Engineer that such slopes can be achieved using special screed boards to hold concrete in position during vibration. Secure formwork for sloping upper surfaces to prevent uplift due to pressure of concrete. A.4. LOADINGS: design and construct formwork to ACI 347R to avoid high intensity point loads and to withstand: vertical loads including weight of formwork, reinforcement, concrete and live loads etc. lateral pressure of concrete horizontal loads including wind etc. special loads including impact, uplift, concentrated loads etc. A.5. DECK LOADINGS: advise the Engineer of construction load of each deck. Prop through decks if construction load on particular deck exceeds: design loading, or reduced loading agreed with the Engineer for decks cast less than 28 days. A.6. BEARINGS: submit details of proposed prop bearings to the Engineer for checking the effects on structure. A.7. CAMBERS: submit details of proposed cambers to soffits of beams and slabs. Make allowance for deflection of formwork under weight of concrete to achieve agreed cambers. A.8. DEFLECTION: maximum permissible deflection of formwork under loads is not to exceed 3 mm or 1/600 of free span, whichever is less. A.9. DURING CONCRETE PLACING, secure wedges and other adjusting devices against movement and maintain watching to ensure no movement oceurs. A.10. KICKERS: to be not less than 150 mm high and cast monolithically with base slab. Provide to all joints unless otherwise instructed or indicated on the Drawings. A.11. JOINTS IN FORMS: construct to prevent loss of grout between joints in form linings and between forms and completed work. A.12. TEMPORARY OPENINGS: provide where necessary in formwork for cleaning and inspection. A.13. FIXING DEVICES: no metal part of any device for securing forms is to remain within specified concrete cover except where agreed by the Engineer. No ties are to pass through concrete members designed to be part of watertight structure. Do not use wire form ties except where agreed by the Engineer.
5.4.2.B	TREATMENT OF FORM FACES: B.1. RELEASE AGENTS: do not apply to reinforcement, hardened concrete or other materials not part of the form face or to permanent forms. Use same type and make throughout entire area of one finish. Apply evenly to the form faces from top downwards and to horizontal surfaces last. Use minimum amount necessary to obtain clean release and prevent excessive local collection. B.2. SURFACE RETARDERS: do not use without approval except to provide key for other finishes or at construction joints. B3 STEEL FORMWORK: remove loosc mill scale and loose rust before placing concrete.
5.4.2.C	STRIKING: C.1. RESPONSIBILITY: notwithstanding other requirements in the Specification or checking or approval by the Engineer safe removal of formwork and supports is the responsibility of the Contractor. C.2. STRIKE formwork without disturbing, damaging or over-loading structure. C.3. RE-USE: clean, make good and store to approval formwork to be re used. Remove from the site formwork not to be re-used. C.4. RE-PROPPING will be permitted subject to approval. C.5. MINIMUM PERIODS for retaining formwork in position before striking and applicable to ordinary Portland cement concrete without accelerating or retarding admixtures at temperatures above 10 deg. C are as follows: vertical formwork to columns, walls and beams : 2 days pan joist forms removed without disturbing formwork or shoring : 4 days soffit forms to slabs with spansup to 6 m : 10 days soffit forms to slabs with spans over 6 m, to joists, arches and beams : 14 days props to slabs with spansup to 6m ~ : 14 days props to slabs with spans over 6 m, to joists, arches and beams 21 days Obtain prior approval of minimum periods for striking for mixes using accelerating and retarding admixtures or other types of cement. Notwithstanding the above requirements it is the Contractor's responsibility to delay striking formwork until it can be undertaken and completed without causing damage to concrete. C.6 EARLIER STRIKING of soffit forms to slabs, joists, arches and beams prior to striking props is to be achieved without disturbing props. Do not remove props temporarily and subsequently replace.

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5.4.2.D	FIXING PERMANENT FORMS: D.1. FILLER BLOCK ALIGNMENT: keep rows straight using battens, slip tiles or rib spacers as appropriate and approved. D.2. OPEN ENDS OF FILLER BLOCKS: seal by approved method before placing concrete.
5.5	**CONCRETE ELEMENTS**
5.5.1	***SCOPE***
5.5.1.A	: These Works shall consist of furnishing materials and constructing cement concrete works, with or without reinforcement, on a prepared base, all as and where shown on the Drawings.
5.5.2	***DEFINITIONS***
5.5.2.A	: Cementitious Materials: Portland cement alone or in combination with one or more of cementitious materials such as fly ash and other pozzolans, ground granulated blast- furnace slag, and silica fume.
5.5.2.B	: Base Course: Aggregate base course placed beneath the concrete layer.
5.5.3	***SUBMITTALS:***
5.5.3.A	Product data: Product data for proprictary materials and items, including reinforcement (wherever applicable) and forming accessories, admixtures, joint systems, curing compounds, dry-shake finish materials, and others if requested by Engineer.
5.5.3.B	Drawings: Include layout, sections and joint details.
5.5.3.C	Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of engineers and owners, and other information specified.
5.5.3.D	Design Mixes: For cach concrete pavement mix, by an approved independent testing agency. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
5.5.3.E	Samples: 4.5-kg sample of exposed aggregate.
5.5.3.F	Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
5.5.3.G	Material Certificate: Signed by manufacturers certifying that cach of the following materials complies with requirements: — Cementitious materials and aggregates — Steel reinforcement and reinforcement accessories. — Admixtures. — Curing compounds. — Applied finish materials. — Bonding agent or adhesive. — Joint fillers.
5.5.3.H	sufficiently detailed: Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by installation or failure of special excavation support and protection systems.
5.5.3.I	Minutes: Minutes of pre-installation conference.
5.5.3.J	Material Test Report: indicate and interpret test results for compliance of materials with requirements indicated.

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	Field Reports: K.1. Submit three copies of the following reports directly to Engineer from the testing services: Test reports and product data verifying the suitability of aggregate (to include source of the aggregate), cement, cementitious additives, admixtures, joint filler and sealants, dowels, ti¢ bars, mesh reinforcement, curing material and other materials as requested by Engineer. K.2. Test report on preliminary design of concrete mix: At least 15 days prior to the start of paving operations and after approval of all material to be used in the concrete, submit a mix design showing the proportions and actual flexural strength obtained from the concrete. The mix design shall include a complete list of materials including type; brand; source and amount of cement and admixtures; and copies of test reports. The mix design report shall be provided by an Independent testing agency, approved by the Engineer.
5.5.3.K	K.3. At least 15 days before the commencement of paving operation, submit a detailed method statement, for approval by Engineer. K.4. Verification of suitability of base course, in accordance with requirements, prior to placement of pavement. K.5. Pour Records (three copies): Record in an approved form, details of every pour of concrete placed in the pavement including date, location of pour, ambient temperature and temperature of concrete at placement, moisture content of aggregate, details of mix, results of tests and details of cores. K.6. Weekly Records (three copies): Report covering work carried out the preceding week, to include location of all joints. K.7. Monthly Records (three copies): Provide monthly histograms of all 28-day cube or cylinder strengths and accumulative standard deviations and other information, which the Engineer may require concerning placement of the pavement.
5.5.4	***QUALITY ASSURANCE***
5.5.4.A	Codes and Standard: Comply with the Provisions of the following standards, except where more stringent requirements are specified or shown on Drawings: — ACI211.1,301, 305 and 318. — CRSI"Manual of Standard Practice".
5.5.4.B	Material and Installed Work: May require testing and re-testing at anytime during progress of work. Tests, including re-testing of rejected material for installed work, shall be done at the Contractor's expense.
5.5.4.C	Installer Qualification: An experienced installer who has completed pavement work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
5.5.4.D	Manufacturer Qualifications: A firm experienced in manufacturing ready mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
5.5.4.E	esting Agency Qualifications: An independent testing agency, acceptable to Engineer, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated.
5.5.4.F	Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.
5.5.4.G	Equipment and Tools: As necessary for handling materials and performing all parts of the work shall be approved by Engineer as to design, capacity, and mechanical condition. The equipment shall be at the job site before the start of construction operations for examination and approval.
5.5.4.H	Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests, design concrete mixes, and perform field quantity control testing.
5.5.4.I	Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship. Build mockups in the location and of the size indicated or, if not indicated, as directed by Engineer. Notify Engineer seven days in advance of dates and times when mockups will be constructed. Obtain Engineer's approval of mockups before starting construction. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement. Demolish and remove approved mockups from the site when directed by Engineer. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
5.5.4.J	Pre-installation Conference: J.1. Conduct conference at Project site to comply with the Engineer’s requirements. J.2. At least 35 days prior to submitting design mixes, review concrete pavement mix design and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with concrete pavement to attend, including the following, as applicable: Engineers. Contractor's superintendent. Independent testing agency responsible for concrete design mixes. Ready-mix concrete producer. Concrete subcontractor.
5.5.5	***PROJECT CONDITIONS***
5.5.5.A	Protect Finished Pavement: Protect from spatter during concrete placement of adjacent sections.

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5.5.5.B	Protect Fresh Concrete: Cover completed fresh concrete with temporary cover as required to protect newly cast pavement from direct sun in hot weather - above 35 C - and maintain cover until curing starts.
5.5.5.C	Protect Immature Concrete: Protect from physical shock, movement, thermal shock and cold water.
5.5.5.D	Protect Surfaces: Protect from rain, wind, sun, indentation and physical damage.
5.5.5.E	Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
5.5.6	***MATERIALS : FORMS***
5.5.6.A	Form Materials: Plywood, metal, metal-framed plywood, or other approved pancl- type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
5.5.6.B	Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
5.5.7	***MATERIALS : STEEL REINFORCEMENT***
5.5.7.A	Reinforcement Bars: ASTM A 615, Grade 60 or BS 4449 Grade B500B, deformed.
5.5.7.B	Plain Steel Wire:: ASTM A 82, cold-drawn steel.
5.5.7.C	Welded Deformed Steel Wire fabric: ASTM A497.
5.5.7.D	Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60 or BS 4449 Grade B500B. Cut bars true to length with ends square and free of burrs.
5.5.7.E	Dowel Bars: High tensile plain steel bars conforming to BS 4449, ASTM A615, ASTM A616, or ASTM A617, and shall be free from burring or other deformation restricting slippage in the concrete. Before delivery to the construction site, a minimum of two-thirds of the length of each dowel bar shall be painted with one coat of zinc-chromate. If plastic or epoxy coated steel dowels are used, no zinc-chromate coating is required, except when specified for a particular situation on the contract plans. Coated dowels shall conform to the requirements given in AASHTO M254.
5.5.7.F	Tie Bars: ASTM A 615M, Grade 60 or BS 4449 Grade B5S00B, deformed.
5.5.7.G	Sleeves: Metal, of an approved design to cover 50 mm to 75 mm of the dowel, with a closed end and with a suitable stop to hold the end of the bar at least 25 mm from the closed end of the sleeve. Sleeves shall be of such design that they will not collapse during construction.
5.5.7.H	Hook Bolts: ASTM F 568M, Property Class 4.6, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
5.5.7.I	Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels in place. Use wire bar type supports complying to CRST's "Manual of Standard Practice".
5.5.7.J	Epoxy Repair Coating: Liquid two-part epoxy repair coating, compatible with epoxy coating on reinforcement.
5.5.8	***MATERIALS: CONCRETE MATERIALS***
5.5.8.A	General:: Use the same brand and type of cementitious material from the same manufacturer throughout the Project, unless otherwise accepted by Engineer.
5.5.8.B	Portland Cement: ASTM C 150, Type I or EN 197-1 Type CEM 1 42.5N.
5.5.8.C	Aggregate:: ASTM C33 / EN 12620, shall consist of crushed stone, crushed or uncrushed gravel, or natural sand. The aggregate shall be composed of sound, tough, durable particles and shall meet the requirements for deleterious substances given in ASTM C33 / BS EN 12620. The aggregate in any size group shall not contain more than 8 percent by weight of flat or elongated pieces when tested in accordance with ASTM D4791. A flat or elongated particle is one having a ratio between the maximum and the minimum dimensions of a circumscribing rectangular prism exceeding 5 to 1. The absorption content of the aggregate material shall not exceed 2% when tested according to ASTM C127 and C128 standards. Uniformly graded, from a single source, with coarse aggregate as follows:
5.5.8.D	Aggregate Gradation:: Fine Aggregate: Conform to the requirements of ASTM C33 (Table 1) or EN 12620.
5.5.8.E	Water:: Water used in mixing or curing shall be as clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product as possible. Water will be tested in accordance with the requirements of AASHTOT26, ASTM C94 or EN 1008. The chloride content shall not exceed 500ppm.
5.5.9	***MATERIALS: ADMIXTURES***
5.5.9.A	General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.
5.5.9.B	General: The use of any material added to the concrete mix shall be approved by Engineer. Submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, Engineer may require the submittal of complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests will be made of samples taken by Engineer from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

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5.5.9.C	Air Entraining Admixtures: Air-entraining admixtures shall meet the requirements of ASTM C260 or BS EN 480 and shall be added to the mix in the amount necessary to produce the specified air content, if requested by the Engineer. The air-entrainment agent and the water reducer admixture shall be compatible.
5.5.9.D	Chemical Admixtures:: Water reducing and set-retarding shall meet the requirements of ASTM C494 or EN 934. — Water-Reducing Admixture: ASTM C 494, Type A or EN 934, — High-Range, Water-Reducing Admixture: ASTM C 494, Type F or EN 934, — Water-Reducing and Accelerating Admixture: ASTM C 494, Type E or EN 934,— Water-Reducing and Retarding Admixture: ASTM C 494, Type D or EN 934.
5.5.10	***MATERIALS: CURING MATERIALS***
5.5.10.A	Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately. 305 g/sq. m dry.
5.5.10.B	Moisture-Retaining Cove: ASTM C 171, polyethylene film or white burlap- polyethylene sheet.
5.5.10.C	Water:: Potable.
5.5.10.D	Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
5.5.10.E	Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
5.5.10.F	Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
5.5.10.G	White Waterborne ~ Membrane-Forming Curing Compoun: ASTM C 309, Type 2, Class B.
5.5.11	***MATERIALS: RELATED MATERIALS***
5.5.11.A	Pre-molded Joint Fil: Conform to the requirements of ASTM D1751 or BS 6093 and shall be punched to admit the dowels where called for on the plans.
5.5.11.B	Joint Filler: Furnished in a single piece for the full depth and width required for the joint, unless otherwise specified by Engineer. When the use of more than one piece is authorized for a joint, the abutting ends shall be fastened securely and held accurately to shape by stapling or other positive fastening means satisfactory to Engineer.
5.5.11.C	Joint Sealer:: Meet the requirements of Section 5.26 of the specification and shall be of the type(s) specified on drawings.
5.5.11.D	Dowels: Galvanized steel, to the dimensions shown on drawings.
5.5.11.E	Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
5.5.12	***MATERIALS: CONCRETE MIXES***
5.5.12.A	: Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by laboratory trial mixes.
5.5.12.B	: Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method. Do not use Employer's field quality-control testing agency as the independent testing agency.
5.5.12.C	: Proportion mixes to provide concrete with the following properties using test specimens prepared in accordance with ASTM C31 and tested with ASTM C78 or BS EN 12390-5: — Compressive Strength on Cylinder (28 Days): sce Table 5.1. — The minimum cementitious material content shall be in accordance with Table 5.1. — The ratio of water to cementitious material, including free surface moisture on the aggregates but not including moisture absorbed by the aggregates shall be in accordance with Table 5.1.
5.5.12.D	Slump Limit: — The mix determined shall be workable concrete having a slump for side-form concrete, as determined by ASTM C143 or BS EN 12350- 2, in accordance with Table 5.1. — Absorption and Permeability tests on hardened concrete should be carried out in accordance with the requirements of BS 1881-122 and BS EN 12390-08. Generally the mean water absorption of the tested concrete shall not exceed 2% and the depth of penetration shall not exceed 25mm. When very low permeability is required, as specified in 8-001 "General Notes", the mean water absorption of the tested concrete shall not exceed 1,6% and the depth of penetration shall not exceed 10mm.
5.5.12.E	Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement (if used) in concrete as follows: — Fly Ash to BS EN 450-1: 25 percent.— Ground Granulated Blast-Furnace Slag to BS EN 15167-1: 50 percent.
5.5.12.F	Air Entraining: If requested by the Engineer, air-entraining admixture shall be added in such a manner that will insure uniform distribution of the agent throughout the batch. The air content of freshly mixed air entrained concrete shall be based upon trial mixes with the materials to be used in the work adjusted to produce concrete of the required plasticity and workability. The percentage of air-entrainment in the mix shall be in accordance with Table 3. Air content shall be determined by testing in accordance with ASTM C231 or BS EN 12350-7.
5.5.12.G	Chemical Admixtures: Water-reducing and set-controlling admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted on trial mixes, during the mix design, in accordance with ASTM C494 or EN 934 standards.

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5.5.12.H	Slip-form Construction:: high degree of uniformity in the plastic concrete is required. Caution should be exercised in establishing the air entrainment percentage, as excessive air entrainment will aggravate edge slumping and insufficient air entrainment will result in poor concrete durability. Some edge slump of the wet concrete behind the side form on the paving machine will occur, even with low slump concrete. This may continue, though very slowly, until initial set has taken place.
5.5.13	***MATERIALS: CONCRETE MIXING***
5.5.13.A	Ready-Mixed Concrete:: Comply with requirements and with ASTM C 94 and ASTM C 1116. When air temperature is between 30 deg C and 32 deg C, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 32 deg C, reduce mixing and delivery time to 60 minutes.
5.5.13.B	Concrete:: B.1. Shall be mixed in a central mix plant and transported in truck mixers. The mixer shall be of an approved type and capacity. Mixing time shall be measured from the time all materials, except water, are emptied into the drum. B.2. Ready-mixed concrete shall be mixed and delivered in accordance with the requirements of ASTM C 94, except that the minimum required revolutions of the mixing speed for transit mixed concrete may be reduced to not less than that recommended by the mixer manufacturer. B.3. The number of revolutions recommended by the mixer manufacturer shall be indicated on the manufacturer's serial plate attached to the mixer. B.4. Furnish test data acceptable to Engineer verifying that the make and model of the mixer will produce uniform concrete conforming to the provisions of ASTM C 94 at the reduced number of revolutions shown on the serial plate.
5.5.13.C	: mixed at the work site or in a central mixing plant, the mixing time shall not be less than 50 seconds nor more than 90 seconds. Mixing time ends when the discharge chute opens. Transfer time in multiple drum mixers is included in mixing time. The contents of an individual mixer drum shall be removed before a succeeding batch is emptied therein.
5.5.13.D	Mixer: D.1. Operated at the drum speed as shown on the manufacturer's nameplate on the approved mixer. Any concrete mixed less than the specified time shall be discarded at own expense. D.2. The volume of concrete mixed per batch shall not exceed the mixer's nominal capacity in cubic meters, as shown on the manufacturer's standard rating plate on the mixer. D.3. Anoverload up to 10 percent above the mixer's nominal capacity may be permitted provided concrete test data for segregation and uniform consistency are satisfactory, and provided no spillage of concrete takes place
5.5.13.E	Batch:: Charged into the drum so that a portion of the mixing water shall enter in advance of the cement and aggregates. The flow of water shall be uniform, and all water shall be in the drum by the end of the first 15 seconds of the mixing period. The throat of the drum shall be kept free of such accumulations as may restrict the free flow of materials into the drum.
5.5.13.F	Mixed Concrete: F.1. Central mixing plant concrete shall be transported in truck mixers, truck agitators, or non- agitating trucks. F.2. The time elapsing from the time water is added to the mix until the concrete is deposited in place at the work site shall not exceed 30 minutes when the concrete is hauled in non- agitating trucks, nor 45 minutes when the concrete is hauled in truck mixers or truck agitators. All these operations must be performed within 45 minutes after the initial mixing operations and the water-cement ratio must not be exceeded. F.3. Admixtures for increasing the workability or for accelerating the set will be permitted only when specified for in the contract.
5.5.14	***MATERIALS: LIMITATIONS OF MIXING:***
5.5.14.A	: No concrete shall be mixed, placed, or finished when the natural light is insufficient, unless an adequate and approved artificial lighting system is operated.
5.5.14.B	: Unless authorized in writing by Engineer, mixing and concreting operations shall be discontinued when a descending air temperature in the hade and away from artificial heat reaches 4 deg. C and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 2 deg C.
5.5.14.C	: When concreting is authorized during cold weather the temperature of the mixed concrete shall not be less than 10 deg. C at the time of placement in the forms.
5.5.14.D	: During periods of hot weather when the maximum daily air temperature exceeds 32 deg.C, the recommendations of ACI 305R standard for hot weather concreting shall be respected in addition the following precautions should be taken: the forms and/or the underlying material shall be sprinkled with water immediately before placing the concrete. The concrete shall be placed at the coolest temperature practicable, and in no case shall the temperature of the concrete when placed exceed 32 deg. C. The aggregates and/or mixing water shall be cooled as necessary to maintain the concrete temperature at or not more than the specified maximum.
5.5.15	***EXECUTION: PREPERATION***

Clause No.	CLAUSE
5.5.15.A	: Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.
5.5.15.B	: Remove loose material from compacted subbase surface immediately before placing concrete.
5.5.16	***EXECUTION: EDGE FORMS AND SCREED CONSTRUCTION***
5.5.16.A	: Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for paving to required lines, grades, and elevations. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.
5.5.16.B	: Forms shall be securely set so that they can withstand impacts and vibration of consolidating and finishing equipment without visible spring or settlement. Extend flange braces on the base outward for not less than two thirds of the height of the form. Remove bent, twisted or broken forms, and forms with damaged top surfaces. Use of repaired forms only with inspection and approval. Built-up forms will not be allowed, unless specifically approved. The top faces of forms are not to vary from a true plane by more than 3 mm in 3m. The upstanding leg shall be perpendicular to the base and is not to vary horizontally from true alignment by more than 6 mm at any point. The ends of abutting sections locks together tightly for secure setting. Local defects, such as kinks in steel forms, will not be allowed.
5.5.16.C	Setting:: Forms shall be set ahead of concrete placement and staked into place with at least three pins for each 3-m section. A pin shall be placed at each side of every joint. Form sections shall be tightly locked and free from movement in any direction. Excessive settlement or springing from operation of the finishing machine will not be allowed. Forms shall be cleaned and oiled before concrete placement. The alignment and grade elevations of the forms shall be checked, and corrections made immediately before placing concrete. Reset and recheck forms when they have been disturbed, or when the grade has become unstable.
5.5.16.D	: Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.
5.5.16.E	Removal:: Do not remove forms until the concrete has set for at least 12 hours, unless otherwise approved or where auxiliary forms are used temporarily in widened areas. Remove forms carefully to avoid damaging the pavement, and after removal, the side of the slab shall be cured by the method specified in the current specification.
5.5.17	***EXECUTION: STEEL REINFORCEMENT***
5.5.17.A	General:: Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.
5.5.18	***EXECUTION: PLACEMENT OF REINFORCEMENT***
5.5.18.A	Reinforced Concrete Pavement: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified: — At the time concrete is placed the reinforcing bars shall be free of mud, oil or other organic matter that may adversely affect or reduce bond. Reinforcing steel with rust, mill scale, or a combination of both will be considered satisfactory, provided the minimum dimensions, weight, and tensile properties of a hand wire-brushed test specimen are not less than the applicable ASTM specification requirements. — Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing bars by metal chairs, runners, bolsters, spacers, and hangers, as required. — Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. — Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wireOffset end laps in adjacent widths to prevent continuous laps in either direction.
5.5.19	***EXECUTION: JOINTS***
5.5.19.A	General:: Construct construction, expansion, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

Clause No.	CLAUSE
5.5.19.B	Construction Joints:: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour, unless pavement terminates at isolation joints. -Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 38 mm into concrete. -Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated. -Provide tie bars at sides of pavement strips where indicated. -Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces. -Use epoxy bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
5.5.19.C	Isolation Joints:: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated. -Locate isolation joints at intervals indicated on drawings. -Extend joint fillers full width and depth of joint. -Terminate joint filler less than 12 mm or more than 25 mm below finished surface if joint sealant is indicated. -Place top of joint filler flush with finished concrete surface if joint sealant is not indicated. -Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together. -Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
5.5.19.D	Expansion Joint: Form expansion joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated. -Locate expansion joints at intervals indicated on drawings. -Extend joint fillers full width and depth of joint. -Terminate joint filler less than 12 mm or more than 25 mm below finished surface if joint sealant is indicated. -Place top of joint filler flush with finished concrete surface if joint sealant is not indicated. -Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together. -Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
5.5.19.E	Longitudinal and Transverse Joints:: Constructed as indicated on the plans and in accordance with the following requirements: -All joints shall be constructed true to line with their faces perpendicular to the surface of the pavement. -Joints shall not vary more than 12mm from a true line or from their designated position. -The vertical surface of the pavement adjacent to all expansion joints shall be finished to a true plane and edged to a radius of 6mm or as shown on the plans. -The surface across the joints shall be tested with a 3m straightedge as the joints are finished and any irregularities in excess of 6mm shall be corrected before the concrete has hardened. -Transverse joints shall be at right angles to the centerline of the pavement and shall extend the full width of the slab. -The transverse joints in succeeding lanes shall be placed in line with similar joints in the first lane. All joints shall be so prepared, finished, or cut to provide a groove of the width and depth shown on the plans.
5.5.19.F	Slip-Form Construction: Transverse joints with dowels will require particular care to insure the dowels are accurately placed and not disturbed during concrete placement. -Transverse dowels will require use of an apparatus to firmly hold the dowels perpendicular to the joint and parallel to the slab surface. -During the concrete placement operation, it is advisable to place plastic concrete directly on the dowel assembly immediately prior to passage of the paver to help maintain dowel alignment.
5.5.19.G	Tie Bars:: Deformed bars installed principally in longitudinal joints as shown on the plans. -Tie bars shall be placed at right angles to the centerline of the concrete slab and shall be spaced at intervals shown on Drawings. -Tie bars shall be held in position parallel to the pavement surface and midway between the surfaces of the slab. -When tie bars extend into an unpaved lane, they may be bent at right angles against the form at longitudinal construction joints, unless threaded bolt or other assembled tic bars are specified. -Tie bars shall not be painted, greased, or enclosed in sleeves.

Clause No.	CLAUSE
5.5.19.H	Dowel Bars:: Dowel bars or other load-transfer units of an approved type shall be placed across transverse or other joints in the manner as specified on the plans. -They shall be of the dimensions and spacing as shown and held rigidly in the middle of the slab depth in the proper horizontal and vertical alignment by an approved assembly device to be left permanently in place. -The dowel or load-transfer and joint devices shall be rigid enough to permit complete assembly as a unit ready to be lifted and placed into position. -A metal, or other type dowel expansion cap of sleeve shall be furnished for each dowel bar used with expansion joints. -These caps shall be substantial enough to prevent collapse and shall be placed on the ends of the dowels as shown on the plans. -The caps or sleeves shall fit the dowel bar tightly and the closed end shall be watertight. -The portion of each dowel painted with rust preventative paint and shall be thoroughly coated with asphalt MC-70, or an approved lubricant, to prevent the concrete from binding to that portion of the dowel.
5.5.19.I	Lubricate: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
5.5.19.J	Joints Installation: The top of an assembled joint device shall be set at the proper distance below the pavement surface and the clevation shall be checked. Such devices shall be set to the required position and line and shall be securely held in place by stakes or other means during the pouring and finishing of the concrete. The pre-molded joint material shall be placed and held in a vertical position; if constructed in sections, there shall be no offsets between adjacent units. Dowel bars shall be checked for exact position and alignment as soon as the joint device is staked in place, and the device shall be tested to determine whether it is firmly supported. The maximum permissible tolerance on dowel bar alignment in each plane, horizontal and vertical, shall not exceed 2 percent or 6mm per 300 mm of a dowel bar. The most effective way to obtain proper alignment is with well-fabricated dowel baskets and dowel assemblies. -When joints in concrete pavements are sawed, the joints shall be cut as shown on the plans. The circular cutter shall be capable of cutting a groove in a straight line and shall produce a slot at least 3mm wide and to the depth shown on the plans. When shown on the plans or required by the specifications, the top portion of the slot groove shall be widened by means of a second shallower cut or by suitable and approved beveling to provide adequate space for joint sealers. Sawing of the joints shall commence as soon as the concrete has hardened sufficiently to permit cutting without chipping, spalling, or tearing. Sawing shall be carried on both during the day and night as required. The joints shall be sawed at the required spacing consecutively in sequence of the concrete placement, unless otherwise approved by Engineer.
5.5.19.K	Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows: — Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to the radius shown on drawings. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces. — Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into concrete to the width shown on drawings, when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
5.5.19.L	Longitudinal Joints: — Construction Type: Longitudinal construction joints necessary for lane construction shall be formed against suitable side forms as indicated in the plans. Wooden forms may be used under special conditions, when approved by Engineer. Where butt-type joints with dowels are designated, the dowels for this type shall be painted and greased. The edges of the joint shall be finished with a grooving tool or edging tool, and a space or slot shall be formed along the joint of the dimensions, as indicated, to receive the joint sealing material. Longitudinal construction joints shall be sawed to provide a groove at the top conforming to the details and dimensions indicated on the plans. Provisions shall be made for the installation of tie bars as noted on the plans. — Expansion type:Longitudinal expansion joints shall be installed as indicated on the plans. The premoulded filler, of the thickness as shown on the plans, shall extend for the full depth and width of the slab at the joint, except for space for sealant at the top of the slab. The filler shall be securely staked or fastened into position perpendicular to the proposed finished surface. A metal cap shall be provided to protect the top edge of the filler and to permit the concrete to be placed and finished. After the concrete has been placed and struck off, the cap shall be carefully withdrawn leaving the space over the premoulded filler. The edge of the joint shall be finished and tooled while the concrete is still plastic. placed and struck off, the cap shall be carefully withdrawn leaving the space over the premoulded filler. The edge of the joint shall be finished and tooled while the concrete is still plastic.

Clause No.	CLAUSE
5.5.19.M	Transverse Joints: M.1. Expansion Type: — Transverse expansion joints shall be installed at the locations and spacing as shown on the plans. The joints shall be installed at right angles to the centerline and perpendicular to the surface of the pavement. The joints shall be installed and finished to insure complete separation of the slabs. Expansion joints shall be of a premoulded type conforming to these specifications and with the plans and shall be the full width of the pavement strip. — All concrete shall be cleaned from the top of the joint material. Before the pavement is opened to traffic, this space shall be swept clean and filled with approved joint sealing material. — All devices used for the installation of expansion joints shall be approved by Engineer. They shall be easily removable without disturbing the concrete and held in proper transverse and vertical alignment. Immediately after forms are removed, any concrete bridging the joint space a the ends shall be removed for the full width and depth of the joint. — When specified, expansion joints shall be equipped with dowels of the dimensions and at the spacing and location indicated on the plans. The dowels shall be firmly supported in place and accurately aligned parallel to the subgrade and the centerline of the pavement by means of a dowel assembly, which will remain in the pavement and will ensure that the dowels are not displaced during construction. M.2. Contraction Type: Transverse contraction joints, weakened-plane joints, or both, shall be installed at the locations and spacing as shown on the plans. These joints will be installed by forming a groove or cleft in the top of the slab while the concrete is still plastic or by sawing a groove into the concrete surface after the concrete has hardened in the same manner as specified. Dowel bar assemblies shall be installed as shown on the plans. M.3. Construction Type: Transverse construction joints shall be installed at the end of each day's placing operations and at any other points within a paving lane when concrete placement is interrupted for more than 30 minutes or it appears that the concrete will obtain its initial set before fresh concrete arrives. When the installation of the joint can be planned in advance, it shall be located at a contraction or expansion joint. The joint shall not be allowed within 2500 mm of a regular spaced transverse joint. If the pouring of the concrete has been stopped causing a joint to fall within this limit, it shall not be installed and the fresh placed concrete shall be removed back to the 2500 mm lim
5.5.19.N	Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to the radius shown on drawings. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.
5.5.20	***EXECUTION: CONDITIONING OF UNDERLYING COURSE, SLIP-FORM CONSTRUCTION***
5.5.20 .A	: The base course on which the pavement will be placed shall extend approximately 900 mm beyond the paving machine track to support the paver without any noticeable deformation. Where necessary, the base course will be extended at own expense.
5.5.20 .B	: If damage occurs to the base course, it shall be corrected full depth or the damaged areas filled with concrete integral with the pavement. If traffic is allowed to use the prepared grade, the grade shall be checked and corrected immediately before the placement of concrete.
5.5.20 .C	: he prepared grade shall be well moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from concrete.
5.5.21	***EXECUTION: CONDITIONING OF UNDERLYING COURSE, SIDE-FORM CONSTRUCTION***
5.5.21.A	Prepared Grade: Well moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from the concrete.
5.5.21.B	: If damage occurs to the base course, it shall be corrected full depth, or the damaged areas filled with concrete integral with the pavement.
5.5.21.C	: A multiple-pin template weighing not less than 454 kg per 6 m or other approved template shall be provided and operated on the forms immediately in advance of the placing of the concrete. The template shall be propelled only by hand and not attached to a tractor or other power unit. Templates shall be adjustable so that they may be set and maintained at the correct contour of the underlying course. The adjustment and operation of the template shall be such as will provide an accurate re-test of the grade before placing the concrete thereon. All excess material shall be removed. Low areas may be filled with concrete integral with the pavement.
5.5.22	***EXECUTION: HANDLING, MEASURING, AND BATCHING MATERIAL***
5.5.22.A	Batch Plant Site: Layout, equipment, and provisions for transporting material shall assure a continuous supply of material to the work.
5.5.22.B	Stockpiles: Built up in layers of not more than 900 mm in thickness. Each layer shall be completely in place before beginning the next layer and shall not be allowed to "cone" down over the next lower layer. Aggregates from different sources and of different grading shall not be stockpiled together. Improperly placed stockpiles will not be accepted by Engineer.

Clause No.	CLAUSE
5.5.22.C	Aggregates: Handled from stockpiles or other sources to the batching plant in such manner to secure the specified grading of the material. Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or binned for draining at least 12 hours before being batched.
5.5.22.D	Cement:: Stored in weather tight structures with raised floors or in suitable silos. Different consignments of bagged cement shall be used separately and in the order of delivery. If, for any reason, cement becomes partially set or contains lumps of caked cement, it shall be rejected. Cement salvaged from discarded or used bags shall not be used. Also, cement manufactured more than twelve months prior to proposed use on site shall not be used.
5.5.22.E	Aggregate:: Fine and coarse aggregate shall be separately weighed into hoppers in the respective amounts set by Engineer in the job mix. Cement shall be measured by weight. Separate scales and hopper, with a device to positively indicate the complete discharge of the batch of cement into the batch box or container, shall be used for weighing the cement.
5.5.22.F	Batch: When required by the contract or when permitted, batching plants shall be equipped to proportion aggregates and bulk cement, by weight,automatically using interlocked proportioning devices of an approved type.
5.5.22.G	Water:: Measured either by volume or by weight. The accuracy of measuring the water shall be within plus or minus 1 percent of required amounts. Unless the water is to be weighed, the water-measuring equipment shall include an auxiliary tank from which the measuring tank shall be filled. The measuring tank shall be equipped with an outside tap and valve to provide for checking the setting, unless other means are provided for readily and accurately determining the amount of water in the tank. The volume of the auxiliary tank shall be at least equal to that of the measuring tank.
5.5.22.H	Equipment: Methods and equipment for adding air-entraining agent or other admixtures to the batch, when required, shall be approved by Engineer. All admixtures shall be measured into the mixer with an accuracy of plus or minus 3 percent.
5.5.23	***EXECUTION: CONCRETE PROTECTION AND CURING***
5.5.23.A	General:: Protect concrete against loss of moisture and rapid temperature changes for at least seven days from beginning of the curing operation. Unhardened concrete shall be protected from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand, ready to use before concrete placement beings. A standby water truck capable of dispensing a fine spray of water shall be continuously available during paving operations to keep the concrete moist until the curing compound has been applied. Provide protection as necessary to prevent cracking of the pavement due to temperature changes during the curing period.

Clause No.	CLAUSE
5.5.23.B	Membrane Curing:: Apply a uniform coating of white pigmented-type membrane curing compound to the entire exposed surface of the concrete by means of an approved automatic spraying machine as soon after finished as free water has disappeared from the finished surface. Coated formed surfaces immediately after the forms are removed and in no case longer than one hour after removal of forms. Do not allow concrete to dry before the application of the membrane. Moisten the surface of the concrete with a fine spray of water and apply curing compound as soon as the free water disappears, if any drying has occurred. The spraying machine shall be self-propelled and ride on the side forms, or previously constructed pavement straddling the newly paved lane. The machine is to have one or more spraying nozzles that can be controlled and operated to completely and uniformly cover the pavement surface with the required amount of curing compound. Thoroughly and continuously agitated curing compound in the drum used for the spraying operation mechanically throughout the full depth of the drum during application. Air agitation may be used only to supplement mechanical agitation. Provide sufficient spraying pressure to produce a fine spray as necessary to cover the surface thoroughly and completely with a uniform film. Maintain spray equipment in good mechanical condition, and provide adequate wind guard to the spray nozzle. Apply curing compound with an overlapping coverage that will give a two-coat application at a coverage rate of not more than 0.1 L/sq. m for each coat or as recommended by the manufacturer. The application of curing compound by hand- operated pressure sprayers will be permitted only on odd widths or shapes of slabs as approved, and on concrete surfaces exposed by removal of forms. Apply the second coat, when application is made by hand-operated sprayer, in a direction approximately at right angles to the direction of the first coat. The compound is to form a uniform, continuous, cohesive film that will not check, crack or peel, and is free of pinholes and other discontinuities. Apply an additional coat, if pinholes, abrasions or other discontinuities exist, to the affected areas within 30 minutes. Respray concrete surfaces that are subjected to heavy rainfall or abrasive wind blown sand within three hours after rainfall or abrasive wind blown sand within three hours after the curing compound has been applied as specified above. Respray areas where the curing membrane is damaged by subsequent construction operations within the curing period. — Precautions shall be taken to ensure that concrete is properly cured at sawed joints, but that no curing compound enters the joints. Tightly seal top of joint opening and joint groove at exposed edges before concrete adjacent to the joint is resprayed. Sealing joint groove by using method that will prevent loss of moisture from the joint during the specified curing period. — Provide approved standby facilities for during concrete pavement at an accessible location at the jobsite for use in the event of mechanical failure of the spraying equipment, or other conditions that might prevent correct application of curing compound at the proper time. — Protect concrete surfaces to which curing compounds have been applied during the curing period from pedestrian and vehicular traffic except as required of joint-sawing operations and surface testing, and from any other possible damage to the continuity of the membrane.
5.5.23.C	Protection:: Protect pavement and its appurtenances from damage caused by all traffic. The Engineer will decide when the pavement may be cleaned and opened to traffic, but not earlier than 14 days after concrete placing. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations of ACI 305R for hot weather protection during curing.
5.5.24	***EXECUTION: CONCRETE PLACEMENT***
5.5.24.A	Inspection: : Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
5.5.24.B	: Moisten subbase to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.
5.5.24.C	: Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
5.5.24.D	: Do not add water or admixture to concrete during delivery, at Project site, or during placement.
5.5.24.E	: Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
5.5.24.F	: Consolidate concrete by mechanical vibrating equipment supplemented by hand- spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
5.5.24.G	: Place concrete up in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats (if any) immediately in final position. Place top layer of concrete, strike off, and screed. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without covered by top layer, or use bonding agent if approved by Engineer.
5.5.24.H	: Following the placing of the concrete, it shall be struck off to conform to the cross section shown on the plans and to an elevation such that when the concrete is properly consolidated and finished, the surface of the pavement shall be at the elevation shown on the plans.

Clause No.	CLAUSE
5.5.24.I	: Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surface treatments.
5.5.24.J	Side Form Method: : — The concrete shall be deposited on the moistened grade to require as little re- handling as possible. Unless truck mixers, truck agitators, or non agitating hauling equipment are equipped with means for discharge of concrete without segregation of the materials, the concrete shall be unlooses into an approved spreading device and mechanically spread on the grade to prevent segregation of the materials. Placing shall be continuous between transverse joints without the use of intermediate bulkheads. Necessary hand spreading shall be done with shovels - not rakes. Workmen shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated with earth or foreign substances. — When concrete is to be placed adjoining a previously constructed lane of pavement and when mechanical equipment will be operated upon the existing lane of pavement, the concrete shall be at least 7 days old and at a flexural strength approved by Engincer. — Concrete shall be thoroughly consolidated against and along the faces of all forms and along the full length and on both sides of all joint assemblies by means of vibrators inserted in the concrete. Vibrators shall not be permitted to come in contact with a joint assembly, the grade, or a side form. In no case shall the vibrator be operated longer than 15 seconds in any one location, nor shall the vibrators be used to move the concrete. — Concrete shall be deposited as near to expansion and contraction joints as possible without disturbing them but shall not be dumped from the discharge bucket or hopper onto a joint assembly unless the hopper is well centered on the joint assembly. — Should any concrete materials fall on or be worked into the surface of a completed slab, they shall be removed immediately by approved methods.
5.5.24.K	Slip-form method: −The concrete shall be placed with an approved crawler-mounted, slip-form paver designed to spread, consolidate, and shape the freshly placed concrete in one complete pass of the machine so that a minimum of hand finishing will be necessary to provide a dense and homogeneous pavement in conformance with requirements of the plans and specifications. The concrete should be placed directly on top of the joint assemblies to prevent them from moving when the paver moves over them. Side forms and finishing screeds shall be adjustable to the extent required to produce the specified pavement edge and surface tolerance. The side forms shall be of dimensions, shape, and strength to support the concrete laterally for a sufficient length of time so that no appreciable edge slumping will occur. Final finishing shall be accomplished while the concrete is still in the plastic state. −The concrete shall be placed with an approved crawler-mounted, slip-form paver designed to spread, consolidate, and shape the freshly placed concrete in one complete pass of the machine so that a minimum of hand finishing will be necessary to provide a dense and homogeneous pavement in conformance with requirements of the plans and specifications. The concrete should be placed directly on top of the joint assemblies to prevent them from moving when the paver moves over them. Side forms and finishing screeds shall be adjustable to the extent required to produce the specified pavement edge and surface tolerance. The side forms shall be of dimensions, shape, and strength to support the concrete laterally for a sufficient length of time so that no appreciable edge slumping will occur. Final finishing shall be accomplished while the concrete is still in the plastic state. −It is the intent of the specification to produce a high quality, dense, long lasting, and smooth pavement suitable for serving traffic loading. This requires that all joints, and particularly all longitudinal joints, meet the specified tolerance throughout their length. In the event that slumping or sloughing occurs behind the paver or if there are any other structural or surface defects, which, in the opinion of Engineer, cannot be corrected within permissible tolerances, Engineer may halt paving operations until proper adjustment of the equipment or procedures have been made. In the event that satisfactory procedures and pavement are not achieved after not more than 600 m of single lane paving, the balance of the work shall be completed with the use of standard metal forms and the formed method of placing and curing.
5.5.24.L	Slip-form pavers: When automatic machine placement is isde for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
5.5.24.M	: When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

Clause No.	CLAUSE
	Hot-Weather Placement:: Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist: −Cool ingredients before mixing to maintain concrete temperature at time of placement below 32 deg C. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
5.5.24.N	−Cover reinforcement steel with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete. −Fog-spray forms, reinforcement steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas. −Concreting shall not be permitted when the rate of evaporation exceed 1.0 kg/m2/hr. (ACI 305R "Hot Weather Concreting").
5.5.25	***EXECUTION: CONCRETE FINISHING***
5.5.25.A	General:: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited. Float Finish:: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots, and fill low spots. Refloat surface immediately to uniform granular texture.
5.5.25.B	−Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float- finished concrete surface perpendicular to line of traffic to provide a uniform, fine- line texture. −Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1.6 to 3 mm deep with a stiff-bristled broom, perpendicular to line of traffic.
5.5.26	***EXECUTION: FINAL STRIKE-OFF, CONSOLIDATION AND FINISHING***
5.5.26.A	Sequence:: The sequence of operations shall be the strike-off and consolidation, floating and removal of laitance, straight edging, and final surface finish. The addition of superficial water to the surface of the concrete to assist in finishing operations generally will not be permitted. If the application of water to the surface is permitted, it shall be applied as a fog spray by means of approved spray equipment.
5.5.26.B	Strike-Off of Concrete:: Following the placing of the concrete, it shall be struck off to conform to the cross section shown on the plans and to an elevation such that when the concrete is properly consolidated and finished, the surface of the pavement shall be at the elevation shown on the plans. Finishing at Joints: Finishing at Joints: −The concrete adjacent to joints shall be compacted or firmly placed without voids or segregation against the joint material; it shall be firmly placed without voids or segregation under and around all load-transfer devices, joint assembly units, and other features designed to extend into the pavement.
5.5.26.C	−Concrete adjacent to joints shall be mechanically vibrated. After the concrete has been placed and vibrated adjacent to the joints, the finishing machine shall be operated in a manner to avoid damage or misalignment of joints. −If uninterrupted operations of the finishing machine, to, over, and beyond the joints, cause segregation of concrete, damage to, or misalignment of the joints, the finishing machine shall be stopped when the screed is approximately 200mm from the joint. −Segregated concrete shall be removed from the front of and off the joint, the screed shall be lifted and set directly on top of the joint, and the forward motion of the finishing machine shall be resumed. Thereafter, the finishing machine may be run over the joint without lifting the screed, provided there is no segregated concrete immediately between the joint and the screed or on top of the joint.

Clause No.	CLAUSE
	Machine Finishing:: −The concrete shall be spread as soon as it is placed, and it shall be struck off and screeded by an approved finishing machine. The machine shall go over each area as many times and at such intervals as necessary to give the proper consolidation and to leave a surface of uniform texture.
5.5.26.D	−Excessive operation over a given area shall be avoided. When side forms are used, the tops of the forms shall be kept clean by an effective device attached to the machine, and the travel of the machine on the forms shall be maintained true without lift, wobbling, or other variation tending to affect the precision finish. During the first pass of the finishing machine, a uniform ridge of concrete shall be maintained ahead of the front screed for its entire length. −When in operation, the screed shall be moved forward with a combined longitudinal and transverse shearing motion, always moving in the direction in which the work is progressing, and so manipulated that neither end is raised from the side forms during the striking-off process. If necessary, this shall be repeated until the surface is of uniform texture, true to grade and cross section, and free from
	Hand Finishing: E.1. Hand finishing methods will not be permitted, except under the following conditions: −In the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on the grade;
5.5.26.E	−In areas of narrow widths or of irregular dimensions where operation of the mechanical equipment is impractical. E.2. Concrete, as soon as placed, shall be struck off and screeded. An approved portable screed shall be used. A second screed shall be provided for striking off the bottom layer of concrete when reinforcement is used. E.3. The screed for the surface shall be at least 600 mm longer than the maximum width of the slab to be struck off. It shall be of approved design, sufficiently rigid to retain its shape, and shall be constructed either of metal or of other suitable material covered with metal. Consolidation shall be attained by the use of a suitable vibrator.
5.5.26.F	Floating:: After the concrete has been struck off and consolidated, it shall be further smoothed, trued, and consolidated by means of a longitudinal float, using approved hand or machine methods. Straight-Edge Testing and Surface Correction:: −After the pavement has been struck off and consolidated and while the concrete is still plastic, it shall be tested for trueness with a 4.8m straightedge. Furnish and use an accurate 4.8m straightedge swung from handles 900 mm longer than one-half the width of the slab. −The straightedge shall be held in contact with the surface in successive positions parallel to the centreline and the whole area gone over from one side of the slab to the other, as necessary. Advancing shall be in successive stages of not more than one-half the length of the straightedge. Any excess water and laitance shall be removed from the surface of the pavement.
5.5.26.G	−Any depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished. −Special attention shall be given to assure that the surface across joints meets the requirements for smoothness. Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straightedge and until the slab conforms to the required grade and cross section. −The use of long-handled wood floats shall be confined to a minimum; they may be used only in emergencies and in areas not accessible to finishing equipment.
5.5.27	***EXECUTION: SURFACE TEXTURE***
5.5.27.A	Brush or Broom Finish: −A brush or broom finish shall be applied to all newly constructed concrete pavements when the water sheen has practically disappeared. −The equipment shall operate transversely across the pavement surface, providing corrugations that are uniform in appearance and approximately 2 mm in depth. −It is important that the texturing equipment not tear or unduly roughen the pavement surface during the operation. Any imperfections resulting from the texturing operation shall be corrected.
5.5.28	***EXECUTION: SKID RESISTANT SURFACES***
5.5.28.A	Wire Combing:: A skid resistant surface shall be provided by wire combing in plastic concrete. The wire combing technique shall use steel combs or tines of various dimensions to form groove-like texture in the plastic concrete pavement and shall provide grooves that are approximately 3 mm by 3 mm spaced 13 mm centre-to-centre.

Clause No.	CLAUSE
5.5.29	***EXECUTION: SURFACE TEST***
5.5.29.A	: As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with a 4.8 m straightedge or other specified device. Areas in a slab showing high spots of more than 6 mm but not exceeding 12 mm in 4.8 m shall be marked and immediately ground down with an approved grinding machine to an elevation that will fall within the tolerance of 6 mm or less. Where the departure from correct cross section exceeds 12 mm, the pavement shall be removed and replaced at own expense when so directed by Engineer.
5.5.29.B	: Any area or section so removed shall not be less than 3 m in length nor less than the full width of the lane involved. When it is necessary to remove and replace a section of pavement, any remaining portion of the slab adjacent to the joints that is less than 3 m in length shall also be removed and replaced.
5.5.30	***EXECUTION: REMOVING FORMS***
5.5.30.A	: Unless otherwise specified, forms shall not be removed from freshly placed concrete until it has set for at least 12 hours, except where auxiliary forms are used temporarily in widened areas. Forms shall be removed carefully to avoid damage to the pavement. After the forms have been removed, the sides of the slab shall be cured. Major honeycombed areas shall be considered as defective work and shall be removed and replaced. Any area or section so removed shall not be less than 3 m in length nor less than the full width of the lane involved. When it is necessary to remove and replace a section of pavement, any remaining portion of the slab adjacent to the joints that is less than 3 m in length shall also be removed and replaced.
5.5.31	***SEALING JOINTS***
5.5.31.A	: The joints in the pavement shall be sealed as shown on Drawings and as specified in Section 5.26.
5.5.32	***OPENING TO TRAFFIC***
5.5.32.A	: The Engineer shall decide when the pavement shall be opened to traffic. The pavement will not be opened to traffic until test specimens moulded and cured in accordance with ASTM C31 have attained the specified flexural strength when tested in accordance with ASTM C78, unless otherwise acceptable to Engineer.
5.5.33	***PAVEMENT TOLERANCES***
5.5.33.A	: A. Comply with tolerances of ACI 117 and as follows: − Elevation: 6 mm. − Thickness: Plus 9 mm, minus 6 mm. − Surface: Gap below 3-m long, unlevelled straightedge not to exceed 6 mm. − Lateral Alignment and Spacing of Tie Bars and Dowels: 25 mm. − Vertical Alignment of Tie Bars and Dowels: 6 mm. − Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 13 mm. − Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 6 mm per 300 mm. − Joint Spacing: 75 mm. − Contraction Joint Depth: Plus 6 mm, no minus. − Joint Width: Plus 3 mm, no minus.
5.5.33.B	: Extreme care must be exercised in all phases of the operation to assure the pavement will pass the specified tolerances. The following tolerances are applicable: −Lateral deviation from established alignment of the pavement edge shall not exceed plus or minus 30 mm in any lane. −Vertical deviation from established grade shall not exceed plus or minus 12 mm at any point. −Surface smoothness deviations shall not exceed 6 mm from a 4.8 m straightedge placed in any direction, including placement along and spanning any pavement joint or edge.
5.5.34	***PAVEMENT MARKING***
5.5.34.A	: Do not apply pavement marking paint until layout, colors and placement have been verified by the Engineer.
5.5.34.B	: Allow concrete pavement to cure for 28 days and be dry before starting pavement marking.
5.5.34.C	: Sweep and clean surface to eliminate loose material and dust.
5.5.35	***FIELD QUALITY CONTROL***
5.5.35.A	Slump:: One test at point of discharge for each day's pour of concrete. Additional tests when concrete consistency seems to have changed.
5.5.35.B	Concrete Temperature:: Test hourly when air temperature is 4 deg C and below, and when 27 deg C and above, and each time a set of flexural test beams are made.
5.5.35.C	Testing Agency:: Engage a qualified independent testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

Clause No.	CLAUSE
5.5.35.D	Testing Services:: Testing shall be performed according to the following requirements: −Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C 172, except modified for slump to comply with ASTM C 94. −Slump: ASTM C 143; one test at point of placement for each flexural and/or compressive-strength test, but not less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes. −Air Content: ASTM C 231, pressure method; one test for each flexural and/or compressive strength test, but not less than one test for each day's pour of each type of air-entrained concrete. −Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 4.4 deg.C and below and when 27 deg.C and above, and one test for each set of flexural and/or compressive-strength specimens. −Compression Test Specimens: ASTM C 31/C 31M; one set of four standard cylinders for each compressive-strength test, unless otherwise indicated. Cylinders shall be molded and stored for laboratory-cured test specimens unless field-cured test specimens are required. −Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 4 cu. m, but less than 19 cu. m, plus one set for each additional 38 cu. m. One specimen shall be tested at 7 days and two specimens at 28 days; one specimen shall be retained in reserve for later testing if required. −When frequency of testing will provide fewer than five compressive- strength tests for a given class of concrete, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used. −When strength of field-cured cylinders is less than 85 % (percent) of companion laboratory-cured cylinders, current operations shall be evaluated and corrective procedures shall be provided for protecting and curing in-place concrete. −Strength level of concrete will be considered satisfactory if averages of sets of three consecutive compressive-strength test results equal or exceed specified compressive strength and no individual compressive-strength test result falls below specified compressive strength by more than 3.4 MPa.
5.5.35.E	: Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
5.5.35.F	Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as the sole basis for approval or rejection.
5.5.35.G	Additional Tests: Testing agency shall make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.
5.5.36	***REPAIRS AND PROTECTION***
5.5.36.A	: Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.
5.5.36.B	: Drill test cores where directed by Engineer when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.
5.5.36.C	Protect concrete from damage.: Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
5.5.36.D	: Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.
5.6	**WATERPROOFING FOR STRUCTURES**
5.6.1	***GENERAL***
5.6.1.A	RELATED DOCUMENTS: Drawings and general provisions of the Contract, including Conditions of Contract and Specification Sections, apply to this Section.

Clause No.	CLAUSE
	SUMMARY: This Section includes the following: 1. Polyethylene sheet 2. APP modified bituminous sheets 3. Coating materials
5.6.1.B	Related Sections include the following: 1. Section 5.01 “Concrete and concrete mixes and testing” 2. Section 5.02 “Concrete handling, placing and curing” 3. Section 5.05 "Joint sealant and joint filler”.
5.6.1.C	PERFORMANCE REQUIREMENTS: Provide waterproofing that prevents the passage of water.
5.6.1.D	SUBMITTALS: 1. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing. 2.Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions. 3. Samples: For the following products: 300-by-300-mm square of waterproofing and flashing sheet. 4. Installer Certificate: Signed by sheet waterproofing manufacturer certifying that Installer complies with specified requirements. 5. Product Test Reports: From a qualified independent testing agency acceptable to Engineer, indicating and interpreting test results of waterproofing for compliance with requirements, based on comprehensive testing of current waterproofing formulations. 6. Sample Warranty: Before starting waterproofing, copy of sheet waterproofing manufacturer's and Installer's warranty, stating obligations, remedies, limitations, and exclusions.
5.6.1.E	QUALITY ASSURANCE: 1. Installer Qualifications: A qualified installer who is authorized, approved, or licensed by sheet waterproofing manufacturer to install manufacturer's products; and who is eligible to receive waterproofing warranty specified. 2. Source Limitations: Obtain waterproofing materials through one source from a single manufacturer. 3. Mock-up: Apply waterproofing to at least 15 sq. m of deck and/or wall to demonstrate surface preparation, crack and joint treatment, corner treatment, and execution quality. a) Construct mock-up in the location and of the size indicated or, if not indicated, as directed by Engineer. b)Notify Engineer seven days in advance of dates and times when mock-up will be constructed. c) Obtain Engineer's approval of mock-up before starting sheet waterproofing. d) If Engineer determines mock-up does not comply with requirements, reapply waterproofing until mock-up is approved. e) Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion. 4. Pre-installation Conference: Conduct conference at Project site to comply with requirements “Project Management and Coordination Requirements." Review requirements for waterproofing, including surface preparation specified under other Sections, substrate condition and pre-treatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

Clause No.	CLAUSE
5.6.1.F	DELIVERY, STORAGE, AND HANDLING: 1. Deliver liquid materials to Project site in original packages with seals unbroken, labelled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components. 2. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer. 3. Remove and replace liquid materials that cannot be applied within their stated shelf life. 4. Store rolls according to manufacturer's written instructions. 5. Protect stored materials from direct sunlight.
5.6.1.G	PROJECT CONDITIONS: 1. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. − Do not apply waterproofing to a damp or wet substrate. − Do not apply waterproofing in snow, rain, fog, or mist. 2. Maintain adequate ventilation during preparation and application of waterproofing materials.
5.6.1.H	WARRANTY: 1. Manufacturer's Warranty: Provide written warranty, signed by waterproofing manufacturer and Installer, and countersigned by Contractor, agreeing to replace waterproofing material that does not comply with requirements or that does not remain watertight during specified warranty period. Warranty includes responsibility for removing and replacing construction and other work that conceals sheet waterproofing, coating materials and rubber/latex emulsions. a)Warranty Period for flexible waterproofing sheets: Ten years after date of Substantial Completion. b) Warranty Period for coating materials: Ten years after date of Substantial Completion. c) Warranty period for rubber latex waterproofing emulsion: Ten years after date of substantial completion.
5.6.1.J	FLEXIBLE SHEET MATERIALS: J.1. POLYETHYLEENE SHEET: damp-proof membrane, complying with ASTM D4397, not less than 0.25 mm thick J.2. APP MODIFIED BITUMINOUS SHEET: high performance, torch applied prefabricated, modified bituminous membrane consisting of Attactic Polypropylene (APP) for greater elasticity and flexibility, smooth surfaced, reinforced with spun bonded non-woven polyester mat for increased strength, toughness and dimensional stability, complying with ASTM D6222/D6222M, grade S, type [or II. , having the following properties when tested according to ASTM D5147, ASTM D5636 & ASTM D6223 Standards.
5.6.1.K	COATING MATERIALS: K.1 CRYSTALLINE WATERPROOFING: Pre-packaged, grey or white- colored proprietary blend of Portland cement, specially treated sand, and active chemicals that, when mixed with water and applied, penetrates into concrete and concrete unit masonry and reacts chemically with the by- products of cement hydration in the presence of water to develop crystalline growth within substrate capillaries to produce an impervious, dense, waterproof substrate; with properties complying with or exceeding the criteria specified below. 1. Water Permeability: Zero for water at 9 m when tested according to COE CRD C48. 2.Compressive Strength: minimum 30 Mpa at 28 days when tested according to ASTM C 109/C 109M. 3. Flexural Strength: minimum 4 MPa at 28 days when tested according to ASTM C 348. 4. Bond Strength: 5 MPa at 14 days when tested according to ASTM C321. K.2 PRIMERS and the like are to be types recommended by coating manufacturer for particular purpose.
5.6.1.L	ACCESSORIES: L.1 GENERALLY: types recommended by sheet or coating manufacturer for particular purpose. L2 ANGLE FILLETS: self-adhesive preformed triangular PVC extrusion or other type recommended by sheet or coating manufacturer. L3 MEMBRANE PROTECTION: approved waterproof and rot-proof protection boards or other alternative means of protection as indicated or recommended by sheet manufacturer.
5.6.2	***WORKMANSHIP***

Clause No.	CLAUSE
5.6.2.A	FIXING SHEET MEMBRANES: A.1 GENERALLY: ensure holes, cracks, defective joints and other defects in surfaces to be covered are made good. Remove dirt, grease, rust and loose material. A2 MANUFACTURER'S RECOMMENDATIONS: to be strictly followed. Apply sheets to clean, dry surfaces with joints sealed to give completely waterproof continuous membrane. A3 PRIMERS: apply by mopping, brushing or spraying to achicve an even and full cover of the surface. Allow to dry before covering. A4 POLYTHENE SHEET: ensure sheets are clean and dry. Lay single layer loose on base, lap edges 150 mm and seal with adhesive tape. A.5 APP MODIFIED BITUMINOUS SHEET: roll out sheets to minimize wrinkles and bubbles; prime base and fix angle fillets and accessories; apply membrane by torch application, coated side down. Lap sides and ends and reinforce with multiple thicknesses of membrane at joints and angles, all in accordance with manufacturer's instructions.. A6 PIPES ETC.: where pipes ctc. pass through sheeting make junctions completely watertight by forming collars fully bonded or sealed to both pipes and sheeting. A7 INSPECTION: inform the Engineer a reasonable length of time before covering any part of membrane with overlying construction to allow inspection. A8 PROTECT finished sheeting and prevent puncturing during following work. Cover sheeting with permanent overlying construction as soon as possible. Immediately prior to covering, check for damage and repair as necessary. A9 MEMBRANE PROTECTION: cover membrane against which backfill material will be placed with protection boards. Provide temporary support as necessary to ensure boards remain fully in contact with membrane during backfilling operations.
5.6.2.B	APPLICATION OF COATINGS: B.1 GENERALLY: ensure holes, cracks, defective joints and other defects in surfaces to be coated have been made good. Remove dirt, grease, rust and loose material. B.2 DRY SURFACES: dampen before applying water based bitumen emulsion. B.3 APPLY COATINGS GENERALLY in accordance with manufacturer's recommendations to clean, dry surfaces, in dry atmospheric conditions, after primer has dried and after previous coats have hardened. B.4 VENTILATION: spaces in which coatings are to be applied are to be well ventilated. B.5 CHEMICAL WATERPROOF COATING: Number of coats and rate of application should be as recommended by manufacturer for particular purpose. B.6 BRUSHING: work coating into recesses, edges, joints, intersections and over surfaces generally to obtain uniform and continuous film. .7 SPRAYING: apply coating with spray gun recommended by coating manufacturer covering recesses, edges, joints, intersections and over surfaces generally to obtain uniform and continuous film. B.8 INTERSECTIONS: ensure continuity of coatings including at junctions with other membranes. B.9 COVERING: final covering is to be laid/applied as soon as possible after coating has hardened.
	FIELD QUALITY CONTROL: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation; membrane application, flashings, protection, and drainage components, and to furnish daily reports to Engineer.
5.6.2.C	Flood Testing: Flood test each deck area for leaks, according to ASTM D 5957, after completing waterproofing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water. Flood to an average depth of 65 mm with a minimum depth of 25 mm and not exceeding a depth of 100 mm. Maintain 50 mm of clearance from top of sheet flashings. Flood each area for 72 hours. After flood testing, repair leaks, repeat flood tests, and make further repairs until waterproofing installation is watertight. Engage an independent testing agency acceptable to Engineer, to observe flood testing and examine underside of decks and terminations for evidence of leaks during flood testing. Prepare test and inspection reports.

Clause No.	CLAUSE
5.6.2.D	PROTECTION, REPAIR, AND CLEANING: Do not permit foot or vehicular traffic on unprotected horizontal membrane. Protect waterproofing from damage and wear during remainder of construction period. Protect installed waterproofing and protection course from damage due to ultraviolet light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where installation may be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation. Correct deficiencies in or remove waterproofing that does not comply with requirements; Repair substrates, reapply waterproofing, and repair sheet flashings. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
5.7	**JOINT SEALANT AND JOINT FILLER**
5.7.1	***PRODUCTS***
5.7.1.A	SECTIONS: A.1 PVC WATER BARS: extruded PVC, heavy duty, of the types and sizes shown on the Drawings, and complete with factory fabricated junction pieces. A2 RUBBER WATER BARS: of the types and sizes shown on the Drawings, hardness 60 to 70 IRHD, tensile strength not less than 20 N/mm2, clongation at break not less than 450%, web thickness varying between 6 and 10 mm according to length and complete with factory fabricated junction pieces.
5.7.1.B	RIGID SHEETS: B.I MOVEMENT JOINT SHEET MATERIAL FILLER for expansion Jjoints, unless otherwise specified, is to be bitumen impregnated fibreboard to ASTM D1751.
5.7.1.C	JOINT SEALANTS: EXPOSED JOINT SEALANT for movement joints unless otherwise specified, is to be an approved polysulphide rubber based compound unless otherwise specified.
5.7.2	***WORKMANSHIP***
5.7.2.A	MOVEMENT AND CONSTRUCTION JOINTS: A.1 GENERALLY: joints are to be: − straight, vertical, horizontal or as detailed or approved − formed to accommodate projecting reinforcement. A.2 MOVEMENT JOINTS are defined as: − formed expansion joints − formed contraction joints A.3 FORMED MOVEMENT JOINTS: construct rigid stops ends and formwork at formed movement joints to permit separate construction of structurally separate parts of the work. A.4 CONSTRUCTION JOINTS: where not coincident with movement joints submit proposals for positions of construction joints and obtain approval. A.5 CONSTRUCTION JOINTS: lightly roughen face to expose coarse aggregate unless otherwise instructed. Wet and cover with 1:1 cement and sand grout immediately prior to placing fresh concrete. Stop roughening 25 mm from arrises to surfaces exposed to view in finished work. Remove small mortar lips from exposed arrises with carborundum stone. Face is to be clean and damp before fresh concrete is placed against it. A.6 CONCRETE FLOORS: side and end forms are to be square edged with steel top surface. A.7 WATERBARS: install at construction joints to form a continuous diaphragm. Install in longest lengths practicable. Fix and support water bars and fabricate joints in accordance with manufacturer instructions. Secure and protect during progress of concreting operations. A.8 PVC WATERBARS: when instructed by the Engincer, test site welded joints for watertightness and strength in accordance with U.S. Corps of Engineers Method CRD- C572, spark test. A.9 SEALING OF MOVEMENT JOINTS: preparation and application is to be strictly as manufacturer's recommendations. Joints are to be thoroughly clean and dry, free from oil and loose material. Vigorously wire brush or grit blast the joint faces and clean out with compressed air. Prime faces of joint and allow to dry. Where exposed to view mask edges of joint with tape before priming and remove immediately after sealing. Apply sealant ensuring maximum adhesion to sides of joint and a neat, smooth and clean finish.
5.8	**JOINT SEALER FOR CEMENT CONCRETE PAVEMENT**
5.8.1	***GENERAL***
5.8.1.A	Summary: A.1 This Section includes joint sealers for the concrete pavement as directed on Site.
5.8.1.B	System Performances: B.1 Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

Clause No.	CLAUSE
5.8.1.C	Submittals: C.1 Product Data from manufacturers for cach joint sealer product required, including instructions for joint preparation and joint sealer application. C.2 Samples for Initial Selection Purposes: Manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available, for each product exposed to view. C.3 Samples for verification purposes of each type and color of joint sealer required. Install joint sealer samples in 6 mm wide joints formed between two 150 mm long strips of material matching the appearance of exposed surfaces adjacent to joint sealers. C.4 Certificates from manufacturers of joint sealers attesting that their products comply with specification requirements and are suitable for the use indicated. C.5 Compatibility and adhesion test reports from elastomeric sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion. C.6 Product test reports for each type of joint sealers indicated, evidencing compliance with requirements specified. C.7 Preconstruction field test reports indicating which products and joint preparation methods demonstrated acceptable adhesion to joint substrates.
5.8.1.D	Delivery, Storage, and Handling: D.1 Deliver materials to Project site in original unopened containers with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials. D.2 Store and handle materials in compliance with manufacturers' recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.
5.8.1.E	Project Conditions: E.1 Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions: — When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer — When joint substrates are wet due to rain, condensation, or other causes. E.1 Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated. E.2 Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.
5.8.2	***PRODUCTS***
5.8.2.A	Materials, General: A.1 Compatibility: Provide joint scalers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience. A.2 Colors: Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by Engineer from manufacturer's standard colours.
5.8.2.B	Joint Sealants: B.1 ASTM D 7116 - Joint Sealants, Hot-Poured, Elastomeric, Fuel-Resistant type, for Portland Cement Concrete Pavements. B.2 Federal Specification SS-S-200-Joint Sealants, Cold-Applied, Two Component, for Portland Cement Concrete Pavements Type M (Machine Application — Fast Curing).
5.8.2.C	Joint Sealant Backing: C.1 General: Provide sealant backings of material and type which are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing. C.2 Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonwaxing, nonextruding strips of flexible, nongassing plastic foam of material indicated below; nonabsorbent to water and gas; and of size, shape and density to control sealant depth and otherwise contribute to producing optimum scalant performance. C.3 Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable. C.4 Round Backer Rod for Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depths and prevent bottom- side adhesion of sealant. C.5 Backer Strips for Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depths, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant. C.6 Rod back-up material and bond-breaker material shall be as recommended by joint sealant manufacturer.

Clause No.	CLAUSE
5.8.2.D	Miscellaneous Materials: D.1 Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer substrate tests and field tests. D.2 Cleaners for Nonporous Surfaces: Provide nonstaining, chemical cleaners of type which are acceptable to manufacturers of sealants and sealant backing materials, which are not harmful to substrates and adjacent nomporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance. D.3 Masking Tape: Provide nonstaining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.
5.8.3	***EXECUTION***
5.8.3.A	Examination: A.1 Examine joints indicated to receive joint sealers, with Installer present, for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.
5.8.3.B	Preparation: B.1 Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements: 1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; old joint sealers; oil; grease; waterproofing; water repellants; water; surface dirt. 2. Remove laitance and form release agents from concrete. B.2 Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces. B.3 Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
5.8.3.C	Installation of Joint Sealers: C.1 General: Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply. C.2 Hot poured Sealants: 1.The joint sealant shall be applied solid, uniformly from bottom to top and shall be filled without formation of entrapped air or voids. A backing material shall be placed as shown on the plans and shall be non-adhesive to the concrete or the sealant material. The heating kettle shall be an indirect heating type, constructed as a double boiler. A positive temperature control and mechanical agitation shall be provided. The sealant shall not be heated to more than 11°C below the safe heating temperature. The safe heating temperature can be obtained from the manufacturer's shipping container. A direct connecting pressure type extruding device with nozzles shaped for insertion into the joint shall be provided. Any sealant spilled on the surface of the pavement shall be removed immediately. 2.Backup materials and bond breakers should be compatible with the sealant, should not adhere to the sealant, should be compressible without extruding the sealant, and should recover to maintain contact with the joint faces when the joint is open.
5.8.3.D	Cleaning: D.1 Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.
5.8.3.E	Protection: E.1 Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

6 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

6.1 Introduction

This chapter presents the Environmental and Social Management Plan (ESMP) that will need to be implemented by the proponent/ contractor to prevent or reduce significant negative impacts to acceptable levels. The entire project components support infrastructure was considered when this ESMP was developed.

Environmental management and social plans for all project phases have been outlined to cover:

- Construction Phase.
- Operation Phase.
- Decommissioning Phase.

The following ESMP Table 7-1 forms the core of this ESMP for the construction, operational and decommissioning phases of the proposed sewer project. The table details all necessary mitigation measures as well as the person responsible for implementing and monitoring such measures. The table should be used as checklist on site. Due to the magnitude of the project, compliance with the ESMP must be monitored periodically, reports prepared and provided at monthly site meetings during the construction phase, and quarterly during the operations and maintenance period as required in EMCA, Cap 387. Annual audits will be conducted during both the construction, operation and maintenance phases.

6.2 Cost of implementation the ESMP

For effective implementation of the ESMP, the project must establish an Environment, Health and Safety (EHS) unit that will be responsible for Project environmental Monitoring and Evaluation to ensure compliance to NEMA and Occupational Health and Safety. The project proponent will be required to produce periodic reports on project environment monitoring to be sent to the concerned agencies for information and supervision. The project proponent will be responsible for all costs of implementing the project's ESIA license conditions, including the EMP and the actual costs of public involvement in the ESIA process. Hence, all costs proposed in the EMP below will be incurred by the project proponent who may transfer all to the contractor/ concessionaire except those of land acquisition and resettlement (Resettlement Action Plan Implementation budget). The costs outlined are current costs mainly for project environmental monitoring and evaluation to ensure compliance to NEMA and OHS. To estimate future costs, an increase to cover annual inflation should be applied. The costs for actual activities should be included in the main bill of quantities of the project.

6.3 Project ESMP Implementation

6.3.1 Role of Environmental, Health and Safety Experts

The ESIA process culminates with the formulation of a comprehensive Environmental and Social Management Plan. To ensure the latter is fully implemented, the Contractor should be required to hire Environmental, Health and Safety (EHS) and social experts who will continuously advise on EHS and social components of the project implementation. Elements in the environmental and social management plan are expected to be integrated in the project with appropriate consultations with Proponent through the supervising environmental and social experts. The EHS and social staff of the contractor will also be expected to fully understand the engineering and management aspects of the project for effective coordination of relevant environmental issues listed in the Environmental and Social Management Plan.

6.3.2 Project supervision

The supervising Engineer will ensure effective implementation of the environmental management plan. It is expected that the project supervisor will engage the services of an EHS experts who should master all environmental recommendations and the proposed action plans, timeframes and expected targets. The experts shall be the liaison persons between the contractor and the proponent on the implementation of environmental, health, safety and social concerns associated with the implementation of the project.

The project proponent shall avail this ESMP to the successful contractor awarded the tender for construction work for this project. The contractor will be required to formulate a more specific ESMP and work methods that will ensure construction of the project in compliance with established standards and legislation. The contractor will factor the costs of implementing the ESMP into their budget. The project proponent will take the necessary steps to ensure that the ESMP is fully implemented.

Table 6-1: Environmental and Social Management Plan – Design, Construction, Operation and Decommissioning Phases

Activity	Associated Impacts	Managements Actions	Responsibility	Budget (KES)
Construction phase				
Setting out and clearance of Project Wayleave	• Temporary removal of assets during the excavations for installation of pipelines.	• Valuation of affected assets. • Full restoration of the affected assets to their original status. • Compensation for the PAPs for non-use of the assets during the interruption period.	NYAHUWASCO Contractor	As quoted
Environmental & Social Training and Awareness	Risks of Environmental and Social degradation risks and occupational health and safety related accidents.	• The Contractor and sub-contractors shall be aware of the environmental requirements and constraints on construction activities contained in the ESIA Report ESMP. • The Contractor will be required to provide for the appropriate Environmental Training. • Awareness as described in this ESIA – ESMP, costs and programming. • An initial environmental awareness training session shall be held prior to any work commencing on site. (Number of trainings, attendance list of participants and training reports).	Contractor and all Workers.	As quoted
HIV/AIDS awareness and prevention campaign	Risks of Increased HIV and Aids transmission in the area.	• Contractor to develop appropriate training and awareness materials for Information and Education. • Develop an intervention strategy compatible with the construction programme to address success of the HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders. • Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs. ((Number of trainings, attendance list of participants and training reports).	Contractor and all Workers.	As quoted

Occupational Health and Safety	Risks of Accidents, Injuries or death of workers or community member.	• Provide construction workers with PPEs (gloves, safety shoes, overalls, reflectors, nose mask, earmuffs and helmets). • Provide temporary toilets and bathrooms for the construction workers at the work sites. • Provide first aid kits accessible by the workers on need. • Isolate the site for access by the local communities during the construction for their safety and health. • Contractor to provide a Healthy and Safety Plan prior to the commencement of works to be approved by the Resident Engineer.	Contractor and Supervisor	As quoted
Noise and Vibration control from plant and equipment	Risk to health and safety of community and workers	• The Contractor shall keep noise level within acceptable limits and construction activities shall, where possible, be confined to normal working hours in the residential, hospitals, schools and other noise sensitive areas shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity. • Any complaints received by the Contractor regarding noise will be recorded and communicated to the Resident Engineer. • The Contractor must adhere to Noise Prevention and Control Rules of April 2005.	Contractor and Supervisor	As quoted
Air Quality.	Air pollution can cause respiratory disorders to human.	• Workers will be trained on management of air pollution from vehicles and machinery. • Construction machinery will be maintained and serviced in accordance with the specifications. • The removal of vegetation shall be avoided until such time as clearance is required and exposed surfaces shall be re-vegetated or stabilised as soon as practically possible. • The contractor shall not carry out dust generating activities (excavation, handling and transport of soils) during times of strong winds. • Vehicles delivering soil materials shall be covered to reduce spills and windblown dust. • Water sprays shall be used on all earthworks' areas within 200 metres of human settlement.	Contractor and Supervisor	As quoted
Local Labour / Employment	Delay in Project implementation due to opposition from community members within the project area.	• Wherever possible, the Contractor shall use local labour, and women must be encouraged to be involved in construction work. • The contractor shall ensure compliance to the gender balance as required by the 2/3 gender rule.	Contractor	No additional cost.
Excavations, vegetation clearance and site preparations.	• Temporary displacement of businesses. • Collapsing excavated trenches. • Health and Safety risks. • Air pollution. • Social nuisance.	• Inform immediate communities or stakeholders of the activities. • Provide barrier tapes, notices, signage and information to the public for their safety at all locations. • Install barriers along walkways, crossings and public places affected by the works for public safety. • Where there is potential for nuisance from dust generation, ensure earth moving is under dump conditions.	Contractor	As quoted

	• Vegetation cover loss/ destruction. • Loss of biodiversity	• Construction activities will be limited to Project sites/ routes, which already exist therefore limited destruction to vegetation cover.	Contractor	As quoted
	Slope stability during trenching for pipelines and excavations for construction works.	• Manual labour shall be used for trenching & backfilling for pipelines and other excavation works in the steep slope areas. • Supporting the sides of the excavation with wooden planks to prevent cave-ins.	Contractor	As quoted
	Top lying soil is lost	• Stock piling of topsoil, construction material and wastes should be done only at designated sites approved by the supervising engineer, erosion prevention through berming of loose soil sites should be done in all areas susceptible to agents of erosion.	Contractor	As quoted
	• Public Health and safety risks. • Worker Occupational safety risks.	• Contractor to notify public the intent to cut sections of the road for safety precautions. • To provide signage and safety information in all work areas. • To ensure compliance by workers with safety safeguards including the OHS, PPE and enforcement of application.	Contractor and Supervisor	As quoted
	Disruption of amenities (access roads, water, cables, electricity and driveways) causing inconveniences to the community.	• Notify other services providers and open sections that can be reinstated within the shortest period to avoid public disruption. • Mark the lines to avoid conflicts with other activities. • Install temporary barriers and signage.	Contractor and Supervisor	To be determined and included in the BOQs
Wastes generation and disposal.	Risks of contaminating surface and underground water resources.	• Construction wastes to be removed for safe disposal. • Recycling to be encouraged. • Contaminated organic matter in the work areas to be isolated for safe disposal • Material residuals to be disposed off in accordance with established NEMA regulations.	Contractor and Supervisor	As quoted
Spoil storage site.	Risks of solid waste mismanagement leading to pollution.	• Preferably to be located on land already cleared wherever possible. • People within the area shall be involved in the site location to avoid conflict. • The need to be more than 20meters from water courses and in a position that will facilitate the prevention of storm-water runoff from the site from entering the watercourse. • Contouring of spoil site to approximate natural topography and drainage and/or reduce erosion impacts on the site. • The Contractor shall ensure that the placement of spoil is done in such a manner to minimise the spread of materials and the impact on surrounding vegetation and that no materials' creep' into' no-go 'areas.	Contractor and Supervisor	No additional cost
Storage of fuel oils, lubricants, chemicals and flammable materials	Hazards of fire outbreak, oil and chemical spills.	Follow specifications of the Occupational Health and Safety Act, EMCA 1999 and others in the development and operation of stores.	Contractor and Supervisor	No additional cost

Sanitation issues resulting from both solid and liquid wastes on site.	Risks associated with water borne diseases exposed to community and workforce	• The Contractor shall follow laws relating to public health and sanitation. • All temporary/ portable toilets or pit latrines shall be secured to the ground to the satisfaction of the Resident Engineer to prevent them from toppling over. • A wash basin with adequate clean water and soap shall be provided alongside each toilet. • Staff shall be encouraged to wash their hands after use of the toilet, in order to minimise the spread of possible disease.	Contractor	As quoted
Traffic management on site	Risks of Accidents, Injuries or death of workers or community member.	• Use of warning signage and tapes where the trenches are open and active sites. • Employ and train road safety Marshalls who will be responsible for management of traffic on sites. • Contractor to provide a traffic management plan during construction to be approved by the Resident Engineer.	Contractor and Supervisor	As quoted
Sexual Exploitation and Abuse (SEA) & Gender-Based	Risks associated with SEA & GBV at construction sites	• Contractor to develop and implement code of conduct, signed by all workers. • Contractor to provide training and awareness programs to project contractor's staff, and community members on GBV and sexual harassment prevention and reporting. • Collaborations with local communities, leaders, and women's groups to address concerns related to GBV and sexual harassment. • Collaboration with local law enforcement and authorities to address and prevent GBV incidents. • Implementation of clear and confidential reporting mechanisms for any incidents of GBV or sexual harassment.	Contractor and Supervisor	As quoted
Violence (GBV)				
Child Labour and Protection	Risk associated with abuse of Children's Rights	• Ensure no children are employed on site in accordance with national labour laws. • Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police	Contractor and Supervisor	No additional cost
Contractor demobilization and site reinstatement.	Associated risks of environmental degradation.	• The site is to be cleared of all construction materials, including litter prior to hand over. • Fences, barriers and demarcations associated with the construction phase must be removed from the site • Rehabilitation activities of environmental cases identified must continue throughout the defect liability period.	Contractor and Supervisor	No additional cost.

Operational phase				
Risk of encroachment and construction of structures on the pipelines' wayleaves	People living within the area will encroach the wayleave and construct permanent and semi-permanent structures.	• Mapping and installation of beacons to which illustrate the width of the pipeline reserve. • Arrest and prosecute. • Regular inspection of the sewerage corridor for encroachment. • Prosecution of encroachers as required by Municipal & County By-laws on way leaves and road reserves maintenance. • Conduct public sensitization programs on importance not interfering with way leaves and public reserve land	NYAHUWASCO Area Chief	To be established
Risk of illegal connection to the water pipelines	People living within the area might make illegal connections and by-pass.	• Seek official water connection by applying and paying connection fee. • This will require constant inspection by NYAHUWASCO officials to identify and repair leakages. • Arrest and prosecute. • Conduct public sensitization programs on importance not interfering with the sewerage and water pipeline.	NYAHUWASCO Area Chief	To be established
Risk of Vandalism of the infrastructure that is Manhole covers	Stealing of manhole covers to re-use or materials. sell as scrap metals	Manhole covers made using concrete and plastic	NYAHUWASCO	To be established
Land and Soil Contamination	Generated wastewater if not properly treated will contaminate land whenever it overflows or pipe bursts.	• The service providers to attend to burst pipes promptly to prevent excessive loss of soil. • Provide high risk areas with appropriate drainage for effective channelling of burst sewage spills. • Encourage landowners along sewer lines to maintain vegetated belts along the pipeline to control any overflows flows and trap soil. They should be encouraged to take responsibilities at the lowest levels in regard to protecting the sewer line • Mark clearly the pipeline for ease of identification and protection by the	NYAHUWASCO	To be established
Decommissioning Phase				
Demolition of project structures and disposal of construction materials	Reduced availability of potable water to beneficiaries Loss of Flora and Fauna Generation of solid wastes	• The proponent shall provide an alternative source of potable water to the beneficiaries of the project. - • The proponent shall ensure minimal clearing of vegetation. • Transportation of decommissioning wastes to be done through the existing local roads. • Sensitization of decommissioning workforce on environmental conservation and ecological protection. • Re-vegetation of cleared areas with indigenous vegetation species.	NYAHUWASCO NYAHUWASCO Decommissioning Contractor	To be established To be established

		• Provision of solid waste collection facilities (waste bins). • Contracting licensed solid waste handlers. • Sensitization of construction workers on proper disposal of solid wastes.	NYAHUWASCO Decommissioning Contractor	To be established
	Water quality degradation	• The contractor will maintain all site vehicles and equipment is a serviceable state. • Oils and greases emanating from demolition activities will be collected in containers to avoid entry into local drainage channels. • Water from cleaning of equipment will be utilized within the project sites and will not be discharged into water courses.	NYAHUWASCO Decommissioning Contractor	To be established
	Air quality degradation	• Restricting traffic speed of machines and vehicles as well as regular watering of dusty roads. • The contractor will ensure proper repair and maintenance of vehicles and equipment to minimize exhaust gases. • Demolition workers will be provided with dust masks to mitigate against occupational health risks of inhaling exhaust gases and dust.	NYAHUWASCO Decommissioning Contractor	To be established
	Noise emissions by Demolition equipment and activities	• Use of noise abatement equipment for machinery; Limit construction activities to daytime only. • Switch off noisy equipment when not in use.	NYAHUWASCO Decommissioning Contractor	To be established
	Increased Vehicular and Human Traffic	• Transportation of decommissioning wastes to specific sites will be done through the existing local roads. • The contractor will rehabilitate the local roads that will be damaged during decommissioning activities. • Consultation with the local communities on planned road diversions. • Restriction of Vehicular and Huma Traffic to the road reserve where possible. • Sensitization of drivers to comply with prescribed speed limits.	NYAHUWASCO Decommissioning Contractor	To be established
	Health and Safety Hazards	• Continuous supervision of occupational, health and safety management to ensure compliance. • Occupational Safety and Health. • Training for contractor's staff. • Conduct orientation talks and visits. • Conduct toolbox talks.	NYAHUWASCO Decommissioning Contractor	To be established
	Employment opportunities for local community	• Positive impact, no mitigation measures. • The contractor shall reserve opportunities for semi-skilled and casual work for interested members of the local communities	NYAHUWASCO Decommissioning Contractor	-

7 ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMoP)

Monitoring and Evaluation (M&E) is a process that helps improve performance and achieve results. The overall purpose of M&E is the measurement and assessment of performance to manage the impacts of a project more effectively. The overall objective of environmental and social monitoring is to ensure that mitigation measures are effectively being implemented. Environmental and social monitoring will also enable response to new and developing issues of concern. The activities and indicators that have been recommended for monitoring are presented in the ESMP.

Internal Monitoring

The project proponent will take the responsibility of conducting regular internal monitoring of the project to verify the results of the Contractor and to audit direct implementation of environmental mitigation measures contained in the ESMP and construction contract clauses for the Project. The proponent will also initiate periodic environmental audits; the audit shall check that mechanisms are in-place to ensure that:

- The ESMMP being used is the up-to-date version.
- Variations to the ESMMP and non-compliance and corrective action are documented.
- Appropriate environmental training of personnel is undertaken.
- Emergency procedures are in place and effectively communicated to personnel.
- A register of major incidents (injuries, complaints) is in place and other documentation related to the ESMMP.
- Appropriate corrective and preventive action is taken by the Contractor once instructions have been issued.

The Construction consultant's and the Contractor' project teams will include environmental and social experts who will direct ESMP activities directly at the site. Monitoring will be a systematic assessment of the activities in relation to the specified criteria of the condition of approval. Internal monitoring will follow the following key criteria.

Air quality monitoring

The contractor shall monitor the site dust levels and emission levels from vehicles and construction equipment. In the cases where suspended dust levels are high, the contractor will take appropriate measures to mitigate the same. Results of regular monitoring of emission levels will inform the servicing of affected vehicles and equipment.

Soil erosion and siltation monitoring

The project E&S Expert will monitor the implementation of soil and siltation control measures. This will include sediment load and turbidity measurements on the nearby surface water resources.

Monitoring of vegetation clearing activities

On-site monitoring will be conducted to ensure that vegetation clearing activities are conducted within the extent of the pipeline trench. Monitoring will also help in the conservation of indigenous vegetation species within the project areas.

Monitoring of Health and Safety

The contractor's E&S officer will ensure that appropriate safety signage is prominently displayed at appropriate locations/positions to mitigate against accidents. Additionally, measures to create awareness regarding sexually transmitted diseases, primarily HIV/AIDS will be taken and the local community

sensitized on the same. The contractor will also monitor the compliance to the site's occupational health and safety policy; where occupational health and safety requirements are not being met; the concerned workers shall immediately be trained and instructed to implement these requirements.

Waste Management Monitoring

The contractor's environmentalist will monitor the management of wastes in the construction sites. This will ensure that all solid and organic wastes are dumped in designated waste receptors and taken to approved landfills; clean sanitary facilities such as mobile toilets are always available to construction staff.

TABLE 7-1: ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMOP)

Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented by	Supervised by
Compensation for loss of livelihood due to business interruptions during pipelines installations.	Construction site	- All PAPs successfully compensated as recorded in the Compensation Entitlement Matrix. - Grievances resolved promptly (within the duration allowed in the Grievance Redress Mechanism.	Prior to commencement of construction activities at sites.	NYAHUWASCO Contractor	E&S Expert Grievance Redress Committee
Restoration of affected assets during pipelines installations.	Construction site	- Visual inspections of restoration of affected assets to their original status. - Grievances resolved promptly (within the duration allowed in the Grievance Redress Mechanism	Prior to commencement of construction activities at sites.	NYAHUWASCO	Project Supervising Engineer E&S Expert Grievance Redress Committee
Occupational Health and Safety	Construction site	- Visual inspection of first aid area, - Injury reporting mechanism, - WIBA insurance policy, - Appropriate use and wearing of PPE, - Training programs for workers, health and safety plan prepared for site, - Clean drinking watering points, Safety - training certificates, gloves, earplugs, safety boots, reflector jackets, drinking water, nose mask, helmet, overall, sanitation facilities.	Daily	Contractor	Project Supervising Engineer, E&S Expert
Public health	Areas surrounding the construction site.	- Visual inspection of site for; safety signs at strategic places, - Cordoned off working sites to protect the public or unauthorized persons, usage of signs and warnings on sites with high risks. - Low speeding of construction vehicle and consideration of wind action. - No. of reported injuries and accidents and No. of grievances reported.	Weekly	Contractor	Project Supervising Engineer, E&S Expert
Leakages and spills of greases, oil or fuel	Contractor's yard and construction site	- Visual inspection of hazardous waste leakage or spills to soils on site, - records of cutting pits for disposed off contaminated soils, - Developed site-specific incident management or response plan.	Weekly	Contractor	Project Supervising Engineer, E&S Expert
Noise and	Construction	- Use equipment with low noise levels or	Weekly	Contractor	Project

vibrations	site	fitted with mufflers. - Visual inspection of site for use of PPE, - Use of soundproof materials, - Notices to public on noisy construction activities, Restricting noisy activities daytime. - Regular measurement of noise levels through mobile phone gadgets.			Supervising Engineer, E&S Expert
Air quality	Construction site and along construct ion vehicle movement routes	- Physical inspection of vehicles records to ensure meets emission requirements, - Use of masks while working in dusty conditions, - Shielding wind impacts during construction, - Low speed of construction vehicle, catalytic devices on vehicle and suppress dust.	Daily	Contractor	Project Supervising Engineer, E&S Expert
Waste generation	Construction sites	- Visual inspection of sanitation facilities for human waste management. - Amount of waste correctly disposed, - Practicing of waste avoidance, reduction, reuse and recycle. - Documented approved waste dumping site. - Presence and compliance to implementations of site-specific waste management plan.	Monthly	Contractor	Project Supervising Engineer, E&S Expert
Flora and fauna	Construction sites	- Documentation of uprooted and cut down trees - Physical Inspection	Weekly	Contractor	Project Supervising Engineer, E&S Expert
Impacts on Soil	Construction sites	- Physical Inspection	Monthly	Contractor	Project Supervising Engineer, E&S Expert
Impacts on water sources	Water sources	- Physical inspection - Chemical inspections	Monthly	Contractor	Project Supervising Engineer, E&S Expert
Labour and employment related issues	Construction site and contractors' office	Physical counts and inspection of records on; - No. of locals employed on the project from the employment records. - No. of Grievance recorded from employees and how they were addressed resolved.	Weekly	Contractor	Project Supervising Engineer, E&S Expert

Immigration of workers	Construction site and office	- Review of records - Interviews with staff and local community	Monthly	Contractor	Project Supervising Engineer E&S Expert
Gender Equity and Sexual Harassment	Construction sites	- Number of female employees - Number of male and female toilets - Complaints from female employees	Weekly	Contractor	Project Supervising Engineer E&S Expert
Damage to private property	Project area	- Review of records - Interviews with staff and local community	Daily	Contractor	Project Supervising Engineer

NYAHURURU WATER AND SANITATION COMPANY LTD

UPGRADING AND REHABILITATION OF WATER PIPE NETWORK IN NYAHURURU MUNICIPALITY

LUMUMBA,SITE PHASE I, KIANO AND UPPER CORESITE
LOWER CORESITE
GARDEN ESTATE

GRAND SUMMARY

Bill No	Description	Amount (KShs)
1	Bill No.1 Preliminary and General Items	-
2	Bill No.2 Lumumba, Kiano, Phase 1 and Upper Cosite Networks	-
3	Bill No.3 Lower Cosite Network	-
4	Bill No.4 Garden Estate Network	-
	BILL TOTAL	**-**
	Contingencies 3%	-
	TOTAL CARRIED TO FORM OF BID	**-**

SIGNATURE OF BIDDER: ……..……..

NAME OF AUTHORIZED REPRESENTATIVE: ……...……

COMPANY STAMP: ……...……..

DATE: ……..……..

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	BILL 1: PRELIMINARY AND GENERAL				
A	**CLASS A: GENERAL ITEMS**				
A1	**Contractual Requirements**				
	Allow for Provision of:				
	Insurance of the Works				
A120.1	Insurance for Works and Contractor's Equipment as per Clause 18.2 of Conditions of Contract.	L.S	1		-
	Third Party Insurance				
A120.2	Insurance against Injury to Third Party Persons and Damage to Property as per Clause 18.3 of Conditions of Contract.	L.S	1		-
	WIBA				
A130.1	Insurance for Contractor's Personnel as per Clause 18.4 of Conditions of Contract.	L.S	1		-
	ESMP mitigation measures				
A150.1	Allow for any costs associated with compliance with environmental, health, and safety requirements in line with the Environmental and Social Management Plan (ESMP) provided for under Section 6 and Section 7 of the technical specifications in the bid document. This compliance shall be consistent with the requirements of respective government agencies and prevailing legislation. The cost under this item shall include a quarterly environmental audit in the ESMP by a registered Lead Expert.	L.S	1		-
	PAGE TOTAL CARRIED TO BILL 1 COLLECTION				-

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
A2	*Specified Requirements*				
A23	*Equipment for use by Engineer's Staff*				
A233.2	Provision of Leica optical auto leveling surveying equipment (28x or higher), complete with hardcase, 2No. 5m Leveling staff and Aluminium Triod. The machine to revert to NYAHUWASCO upon comencement of the project.	Sum	1		-
	Testing				
A251	Concrete Tests	Item	1		-
A252	Testing of materials - Pipes Fittings and appurtenances	Item	1		-
A291	As Built Drawings & Operation and Maintenance (O&M) Manuals	item	1		-
A290	Allow for provision of As-Built Drawings in accordance with the Specifications	Item	1		-
	Sign Boards				
A2100	Allow for provision, erection and maintenance of Project Sign Boards at sites to be indicated by the Engineer within the Project Area and removal upon completion of the Contract. Details of the Sign Board are shown on Drawing No. 301/SD/01.	Item	2		-
	PAGE TOTAL CARRIED TO BILL 1 COLLECTION				-

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	BILL 1 Collection Page				
	Total Page 1				-
	Total Page 2				-
	PAGE TOTAL CARRIED TO BILL 1 COLLECTION				-

Bill NO. 2: Lumumba, Site Phase 1, Kiano and Upper Cosite Networks					
ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	BILL 2: TRANSMISSION LINE WORKS *NOTES:* *Some of the sites have limited wayleaves. Contractors rates to allow for double haulage of excavated materials or any additional costs for execution of the works.* *The Contractor will be required to comply with environmental mitigation measures .* *Use of bulk excavation machines may not be possible within the site.* *The Contractor will be required to submit Method Statement for execution of works under these specific conditions for approval prior to execution of the works.* *No blasting will be permitted in the project areas* **CLASS A: GENERAL ITEMS**				
	Testing of Works				
A261.1	Allow for hydrostatic pressure testing, in accordance with clause 4.3.3 "Pipework testing" of the specification and to the satisfaction of the Engineer.	km	5.8278		-
	Disinfection of Pipelines:				
A260	Flushing with clear water, filling with water containing 0.05g/l calcium hypochlorite, left for 24 hours. This includes supply of necessary equipment, materials, chemicals and water, measurement of residual chlorine, all as specified and safe disposal of disinfecting water in accordance with clause 4.3.3 "Pipework testing" of the specification and to the satisfaction of the Engineer.	km	5.8278		-
PAGE TOTAL CARRIED TO Bill NO. 2 COLLECTION					**-**

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
A27	**Temporary Works**				
	Traffic Diversion				
A271.1	Allow for temporary works for diversion of traffic during construction of pipelines across roads, including sign posting, liaison with project affected persons, liaison with Traffic Police Department, Local Authority construction of diversion roads etc. all to the satisfaction of the Engineer. Include provision for maintaining temporary vehicular access to individual plots at all times.	LS	1		-
	Dewatering				
A276.1	Allow for keeping trenches and other excavation free of water which may have entered through ground seepage, rain or by other means in accordance with clause 2.3.6 "Pipework testing" of the specification and to the satisfaction of the Engineer.	m	3403.8		-
	Setting Out & Survey Work				
A278.1	Allow for Establishment of Level Datum, Setting Out of the Works and picking of levels after every 25m in all the Project Areas in accordance with the Specifications. This shall include staking out of the Pipeline Routes. Include for preparation and submission of Setting Out Survey Report to the Engineer for approval.	L.S	1		-
	PAGE TOTAL CARRIED TO Bill NO. 2 COLLECTION				-

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	CLASS D: DEMOLITION AND SITE CLEARANCE				
D100	**General Clearance** *Includes: Demolition and removal of natural and artificial articles, objects and obstructions which are above the Original Surface* *Notes:* *The Employer has no available land to offer for dumping of spoil materials. Identification of and all accruing costs related to securing suitable area of land for dumping is the responsibility of the Contractor. Dumping and spreading is to be done in accordance with existing National Legislation and Local Authority's by-laws.* *The Contractor is deemed to have allowed for this aspect of Work in their excavation and cart away to tips rates.* ***General Clearance*** *The Contractor's rate for this item will be deemed to include for clearance of any extra land that he may consider necessary for execution of his Work and reinstatement of hedges and fences etc. removed during construction.*				
D100.1	*General Clearance*	ha	0.23		-
	PAGE TOTAL CARRIED TO Bill NO. 2 COLLECTION				-

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	Cutting of Trees				
D21.1	Provide all material and cut trees, girth measured 1m above ground level. Bushes are deemed to be included in Item D100.1. The disposal of trees shall be decided by the Engineer. The rate to include liaison with the relevant authorities and obtaining permission.	nr	3.00		-
	Removal of Tree Stumps				
D21.1	Allow for removal of stumps and backfilling holes with selected excavated material. Girth measured 1m above ground level. The rate shall also include disposal of stumps to tips identified by the Contractor in liaison with the Local Authority, all to the approval of the Engineer.	LS	1		-
	Demolition of structures				
D411	Allow for demolition and removal of structures. The rate shall also include storage demolished material and disposal of waste to tips identified by the Contractor in liaison with the Local Authority, all to the approval of the Engineer.	LS	1		-
D610	Demolition/ Dismantling and Relocation of Pipelines. Allow for demolition/dismantling, removal and relocation of pipelines and valves. The rate shall also include transportation of demolished material to client's storage and disposal of waste to tips identified by the Contractor in liaison with the Local Authority, all to the approval of the Engineer.	m	116.556		-
	PAGE TOTAL CARRIED TO Bill NO. 2 COLLECTION				-

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	CLASS I: PIPEWORK - PIPES				
I0	**Pipe Excavation and Backfilling Works**				
	Rates under this section will be deemed to include: *-Preparation and implementation of a traffic management plan to be submitted for approval by the Resident Engineer prior to commencement of works.* *-Informing immediate communities and stakeholders of the nature and timing of the excavation works.* *-Provision, erection and maintenance of barrier tapes, warning notices, safety signage, and public information displays at all affected locations.* *-Installation and maintenance of physical barriers along pedestrian walkways, crossings, and public spaces to ensure safety during excavation activities.* *-Use of warning signage and barrier tapes at open trenches and active excavation sites.* *-Employment and training of road safety marshalls responsible for on-site traffic management and pedestrian safety.* *-Application of dust suppression measures where excavation activities are likely to generate nuisance dust, including ensuring earth moving operations are conducted under damp conditions.* *-All labour, materials, equipment and incidentals necessary to comply with the above.*				
	Construction depths as: *1200mm cover for Trunk Main Lines* *1000mm cover for Distribution Main lines* *800mm cover for Distribution Minor lines* *600mm cover for Service lines & Customer Connections* *200mm Bed depth for all pipes*				
I011.1	Excavate, backfill and compact pipeline trenchs for the following pipes; width to be 600mm or pipe Ø+400mm whichever is greater. Construction details as per standard drawing STD 11, Measurement details as per Class I of CESMM 4.	m	3403.8		-
I011.2	Extra over I011.1 in hard rock	m	850.95		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
I011.3	Excavate, backfill and compact consumer line trenches. Measurement details as per Class I of CESMM 4.	m	2424		-
I711	**High Density Polyethylene Pipes (HDPE)**				
	Includes Supply, Transport to site and Storage.				
	Notes: *Pipe manufacture should be to KS - ISO 4427. All pipes to be butt-welded (Seamless). Repair of all pipes above OD 160mm to be joined by electrofusion.*				
	HDPE (PE100) (PN 16) for use with Butt Fusion (seamless) Jointing *Customer recconection pipes*				
	Supply and installation of HDPE pipework, including all bends, fittings, specials, warning tapes, testing of pipes and meters as specified, disinfection of pipes; covering also all necessary earthworks such as excavation, backfilling in maximum 30cm layers, bedding, compaction and crossings for other underground infrastructure, reinstatement of murram and concrete				
	The item covers T pieces or saddles. Includes any additional excavation required for these items. Pipe trench dimensions, bedding layers etc., in line with the standard drawings and specifications.				
I711.3	DN 20 mm	m	1697		-
I711.7	DN 25 mm	m	727		-
	HDPE (PE100) (PN 10) for use with Butt Fusion (seamless) Jointing *Distribution lines pipes*				
I711.14	DN 32 (1") mm	m	664.661		-
I711.28	DN 50 (1 1/2") mm	m	726.329		-
I711.35	DN 63 (2") mm	m	1181.01		-
I711.49	DN 90 (3") mm	m	582.852		-
I711.56	DN 110 (4") mm	m	182.762		-
I711.63	DN 125 (5") mm	m	44.613		-
I711.77	DN 160 (6") mm	m	21.577		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	CLASS J: PIPEWORK— FITTINGS AND VALVES				
J6	**High density polyethylene pipe (HDPE) fittings**				
	Rates to include for provision and fixing. Flanges to PN 16 steel unless otherwise stated				
	High Density Polyethylene (HDPE) SDR 11 (PN 16) for with Butt Fusion (seamless) Jointing				
J61	**Bends Plain (Butt Fusion Fittings)**				
	Elbow				
J611.80	DN(63) mm 90°	nr	2		-
J62	**Junctions and Branches (Butt Fussion Fittings)**				
	(PN16) Equal Tee				
J621.47	DN 63 mm 90°	nr	1		-
J621.49	DN 90 mm 90°	nr	3		-
J621.52	DN 160 mm 90°	nr	1		-
	Reducing Tee				
J621.58	DN 63 / DN 50 mm 90°	nr	3		-
J621.59	DN 90 / DN 63 mm 90°	nr	8		-
J621.60	DN 110 / DN 63 mm 90°	nr	3		-
J621.62	DN 125 / DN 63 mm 90°	nr	2		-
J621.65	DN 160 / DN 63 mm 90°	nr	1		-
J621.66	DN 160 / DN 90 mm 90°	nr	3		-
J621.68	DN 160 / DN 125 mm 90°	nr	1		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
J63	**Tapers (Butt Fussion Fittings)**				
	(PN16) Reducer				
J631.42	DN 50 / DN 32 mm	nr	5		-
J631.44	DN 63 / DN 32 mm	nr	3		-
J631.46	DN 63 / DN 50 mm	nr	10		-
J631.55	DN 90 / DN 50 mm	nr	1		-
J631.48	DN 90 / DN 63 mm	nr	5		-
J631.50	DN 110 / DN 90 mm	nr	1		-
J631.65	DN 125 / DN 110 mm	nr	1		-
J631.52	DN 160 / DN 90 mm	nr	2		-
J68	**Straight Specials (Butt Fussion Fittings)**				
	End Cap				
J681.10	DN 32mm	nr	8		-
J681.12	DN 50mm	nr	7		-
J681.13	DN 63mm	nr	2		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	Valves and penstocks				
J81	**Gate Valves; Hand operated**				
	Threaded Brass Gate Valve (PN16) Complete with all fittings as per the schedule "Section Valves at Take off Points' in drawing 303-SD-03. (Genuine Pegler)				
J811.3	DN 25 mm	nr	25		-
J811.5	DN 40 mm	nr	8		-
J811.6	DN 50 mm	nr	9		-
	PN 16, DI Gate Valve. Epoxy Coated, Double Flanged, EPDM Rubber Seated, Dezincification Resitant Brass Wedgenut, Complete with approaching GI Flanges and all fittings (Genuine AVK)				
J811.8	DN 80 mm	nr	5		-
J811.9	DN 100 mm	nr	3		-
J811.10	DN 150 mm	nr	2		-
J86	**Air Valves**				
	PN 16, Single Orifice - Nylon Combination Air Valve Assembly (ARI). Complete with approaching GI Flanges and all necessary fittings				
J861.1	DN 50mm mm	nr	1		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
J899	**Consumer Water Meter Reconection** *Supply fittings, relocate and install customer meters as per standard drawing 307-SD-07. Works to Include provision of Strainer and gatevalve. Works to include relocation and reinstallation of existing customer water meters.*				
J899.2	DN 20mm	nr	212		-
J899.3	DN 25mm	nr	91		-
J89	**Bulk Water Meter** *Supply and Install Flanged Zonal Water Meters, of Woltman type, R 250 and above. To Include water meter, Strainer, Fabricated Flanged Galvanized Iron Pipes and Flange Adaptors for respective meter installation.*				
J899.10	DN 150mm mm	nr	2		-
K	***CLASS K: Pipework – Manholes and Pipework Ancillaries***				
K1	**Manholes**				
K181.1	Provide materials and construct 1m x 1m Masonry manholes, depth not exceeding 1.5m, rate to include cover and frame	nr	22		-
K181.2	Provide materials and construct 1.5m x 1.5m Masonry manholes, depth not exceeding 1.5m, rate to include cover and frame	nr	5		-
K181.7	Provide materials and construct 1.5m x 1.5m Washout chamber, depth not exceeding 1.5m, complete with Washouts Assembly on 110mm Pipe. Include GI TEE, Flanged Connectors, gate Valves and other Fittings. As per Standard drawing XXXX. Rate to include cover and frame	nr	2		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
K6	**Crossings**				
K79	**Breaking up temporary and permanent reinstatement of paved footpaths (concrete, cabro, tarmac, etc.).**				
	Breaking up, temporary and permanent reinstatement of roads with 300mm thick well graded stabilised gravel with 3% cement content base compacted using a 8-10 tonne roller to the satisfaction of the Engineer .				
	Works to include provision of DN 200 mm upvc pipe PN8 with 150mm thich mass concrete class 15/20 surround for road crossings as per standard drawing XXXX.				
	Contractor to allow for liaison with relevant local authorities and obtaining approval for completed works in his rates.				
	Rates quoted shall be deemed to include for costs incurred on traffic control, signage and safety measures during execution of the works. All in accordance with details given in the standard drawings.				
K791.2	Reinstatement of unpaved areas (murrum road crossing). Pipe bore Not exceeding 300mm	m	120		-
K7101.1	Allow for diverting drains, waterlines, Sewerlines or waterways where they might interfere with the construction and reinstate these after construction of the water line has been completed. All waterways to be kept operational during construction.	m	650		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
K8	**Marker Posts**				
K82.1	Excavate for, supply and fix concrete marker posts along the water line route, road crossings, change of direction and valve chambers at locations shown by the Engineer. All in accordance with details given in the standard drawings.	nr	30		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	COLLECTION SHEET				
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	Total Page 5				-
	Total Page 6				-
	Total Page 7				-
	Total Page 8				-
	Total Page 9				-
	Total Page 10				-
	Total Page 11				-
	Total Page 12				-
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Bill NO. 3: Lower Cosite Network					
ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	BILL 2: TRANSMISSION LINE WORKS *NOTES:* *Some of the sites have limited wayleaves. Contractors rates to allow for double haulage of excavated materials or any additional costs for execution of the works.* *The Contractor will be required to comply with environmental mitigation measures .* *Use of bulk excavation machines may not be possible within the site.* *The Contractor will be required to submit Method Statement for execution of works under these specific conditions for approval prior to execution of the works.* *No blasting will be permitted in the project areas* **CLASS A: GENERAL ITEMS**				
	Testing of Works				
A261.1	Allow for hydrostatic pressure testing, in accordance with clause 4.3.3 "Pipework testing" of the specification and to the satisfaction of the Engineer.	km	5.998		-
	Disinfection of Pipelines:				
A260	Flushing with clear water, filling with water containing 0.05g/l calcium hypochlorite, left for 24 hours. This includes supply of necessary equipment, materials, chemicals and water, measurement of residual chlorine, all as specified and safe disposal of disinfecting water in accordance with clause 4.3.3 "Pipework testing" of the specification and to the satisfaction of the Engineer.	km	5.998		-
PAGE TOTAL CARRIED TO Bill NO. 3 COLLECTION					**-**

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
A27	**Temporary Works**				
	Traffic Diversion				
A271.1	Allow for temporary works for diversion of traffic during construction of pipelines across roads, including sign posting, liaison with project affected persons, liaison with Traffic Police Department, Local Authority construction of diversion roads etc. all to the satisfaction of the Engineer. Include provision for maintaining temporary vehicular access to individual plots at all times.	LS	1		-
	Dewatering				
A276.1	Allow for keeping trenches and other excavation free of water which may have entered through ground seepage, rain or by other means in accordance with clause 2.3.6 "Pipework testing" of the specification and to the satisfaction of the Engineer.	m	4468		-
	Setting Out & Survey Work				
A278.1	Allow for Establishment of Level Datum, Setting Out of the Works and picking of levels after every 25m in all the Project Areas in accordance with the Specifications. This shall include staking out of the Pipeline Routes. Include for preparation and submission of Setting Out Survey Report to the Engineer for approval.	L.S	1		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	CLASS D: DEMOLITION AND SITE CLEARANCE				
D100	**General Clearance** *Includes: Demolition and removal of natural and artificial articles, objects and obstructions which are above the Original Surface* *Notes:* *The Employer has no available land to offer for dumping of spoil materials. Identification of and all accruing costs related to securing suitable area of land for dumping is the responsibility of the Contractor. Dumping and spreading is to be done in accordance with existing National Legislation and Local Authority's by-laws.* *The Contractor is deemed to have allowed for this aspect of Work in their excavation and cart away to tips rates.* ***General Clearance*** *The Contractor's rate for this item will be deemed to include for clearance of any extra land that he may consider necessary for execution of his Work and reinstatement of hedges and fences etc. removed during construction.*				
D100.1	*General Clearance*	ha	0.24		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	Cutting of Trees				
D21.1	Provide all material and cut trees, girth measured 1m above ground level. Bushes are deemed to be included in Item D100.1. The disposal of trees shall be decided by the Engineer. The rate to include liaison with the relevant authorities and obtaining permission.	nr	2.00		-
	Removal of Tree Stumps				
D21.1	Allow for removal of stumps and backfilling holes with selected excavated material. Girth measured 1m above ground level. The rate shall also include disposal of stumps to tips identified by the Contractor in liaison with the Local Authority, all to the approval of the Engineer.	LS	1		-
	Demolition of structures				
D411	Allow for demolition and removal of structures. The rate shall also include storage demolished material and disposal of waste to tips identified by the Contractor in liaison with the Local Authority, all to the approval of the Engineer.	LS	1		-
D610	Demolition/ Dismantling and Relocation of Pipelines. Allow for demolition/dismantling, removal and relocation of pipelines. The rate shall also include transportation of demolished material to client's storage and disposal of waste to tips identified by the Contractor in liaison with the Local Authority, all to the approval of the Engineer.	m	59.98		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	CLASS I: PIPEWORK - PIPES				
I0	**Pipe Excavation and Backfilling Works**				
	Rates under this section will be deemed to include: *-Preparation and implementation of a traffic management plan to be submitted for approval by the Resident Engineer prior to commencement of works.* *-Informing immediate communities and stakeholders of the nature and timing of the excavation works.* *-Provision, erection and maintenance of barrier tapes, warning notices, safety signage, and public information displays at all affected locations.* *-Installation and maintenance of physical barriers along pedestrian walkways, crossings, and public spaces to ensure safety during excavation activities.* *-Use of warning signage and barrier tapes at open trenches and active excavation sites.* *-Employment and training of road safety marshalls responsible for on-site traffic management and pedestrian safety.* *-Application of dust suppression measures where excavation activities are likely to generate nuisance dust, including ensuring earth moving operations are conducted under damp conditions.* *-All labour, materials, equipment and incidentals necessary to comply with the above.*				
	Construction depths as: *1200mm cover for Trunk Main Lines* *1000mm cover for Distribution Main lines* *800mm cover for Distribution Minor lines* *600mm cover for Service lines & Customer Connections* *200mm Bed depth for all pipes*				
I011.1	Excavate, backfill and compact pipeline trenchs for the following pipes; width to be 600mm or pipe Ø+400mm whichever is greater. Construction details as per standard drawing STD 11, Measurement details as per Class I of CESMM 4.	m	4468		-
I011.2	Extra over I011.1 in hard rock	m	1117		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
I011.3	Excavate, backfill and compact consumer line trenches. Measurement details as per Class I of CESMM 4.	m	1530		-
I711	**High Density Polyethylene Pipes (HDPE)**				
	Includes Supply, Transport to site and Storage.				
	Notes: *Pipe manufacture should be to KS - ISO 4427. All pipes to be butt-welded (Seamless). Repair of all pipes above OD 160mm to be joined by electrofusion.*				
	HDPE (PE100) (PN 16) for use with Butt Fusion (seamless) Jointing *Customer recconection pipes*				
	Supply and installation of HDPE pipework, including all bends, fittings, specials, warning tapes, testing of pipes and meters as specified, disinfection of pipes; covering also all necessary earthworks such as excavation, backfilling in maximum 30cm layers, bedding, compaction and crossings for other underground infrastructure, reinstatement of murram and concrete				
	The item covers T pieces or saddles. Includes any additional excavation required for these items. Pipe trench dimensions, bedding layers etc., in line with the standard drawings and specifications.				
I711.3	DN 20 mm	m	1071		-
I711.7	DN 25 (3/4") mm	m	459		-
	HDPE (PE100) (PN 10) for use with Butt Fusion (seamless) Jointing *Distribution lines pipes*				
I711.14	DN 32 (1") mm	m	1163		-
I711.28	DN 50 (1 1/2") mm	m	1090		-
I711.35	DN 63 (2") mm	m	928.5		-
I711.49	DN 90 (3") mm	m	861.2		-
I711.56	DN 110 (4") mm	m	95.81		-
I711.63	DN 125 (5") mm	m	104.5		-
I711.77	DN 160 (6") mm	m	225		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	CLASS J: PIPEWORK— FITTINGS AND VALVES				
J6	**High density polyethylene pipe (HDPE) fittings**				
	Rates to include for provision and fixing. Flanges to PN 16 steel unless otherwise stated				
	High Density Polyethylene (HDPE) SDR 11 (PN 16) for with Butt Fusion (seamless) Jointing				
J61	**Bends Plain (Butt Fusion Fittings)**				
	Elbow				
J611.67	DN(50) mm 45°	nr	1		-
J611.76	DN(25) mm 90°	nr	1		-
J611.79	DN(50) mm 90°	nr	2		-
J611.88	DN(90) mm 30°	nr	2		-
J62	**Junctions and Branches (Butt Fussion Fittings)**				
	(PN16) Equal Tee				
J621.44	DN 32 mm 90°	nr	2		-
J621.47	DN 63 mm 90°	nr	2		-
J621.49	DN 90 mm 90°	nr	2		-
J621.52	DN 160 mm 90°	nr	2		-
	Reducing Tee				
J621.56	DN 50 / DN 40 mm 90°	nr	6		-
J621.57	DN 63 / DN 40 mm 90°	nr	2		-
J621.59	DN 90 / DN 63 mm 90°	nr	3		-
J621.60	DN 110 / DN 63 mm 90°	nr	2		-
J621.62	DN 125 / DN 63 mm 90°	nr	3		-
J621.63	DN 125 / DN 90 mm 90°	nr	1		-
J621.65	DN 160 / DN 63 mm 90°	nr	1		-
J621.66	DN 160 / DN 90 mm 90°	nr	2		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
J63	**Tapers (Butt Fussion Fittings)**				
	(PN16) Reducer				
J631.42	DN 50 / DN 32 mm	nr	6		-
J631.44	DN 63 / DN 32 mm	nr	5		-
J631.46	DN 63 / DN 50 mm	nr	9		-
J631.55	DN 90 / DN 50 mm	nr	2		-
J631.48	DN 90 / DN 63 mm	nr	4		-
J631.49	DN 110 / DN 63 mm	nr	1		-
J631.51	DN 125 / DN 90 mm	nr	1		-
J631.65	DN 125 / DN 110 mm	nr	1		-
J631.52	DN 160 / DN 90 mm	nr	2		-
J631.72	DN 160 / DN 125 mm	nr	2		-
J68	**Straight Specials (Butt Fussion Fittings)**				
	End Cap				
J681.10	DN 32mm	nr	8		-
J681.12	DN 50mm	nr	6		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	Valves and penstocks				
J81	**Gate Valves; Hand operated**				
	Threaded Brass Gate Valve (PN16) Complete with all fittings as per the schedule "Section Valves at Take off Points' in drawing 303-SD-03. (Genuine Pegler)				
J811.3	DN 25 mm	nr	15		-
J811.5	DN 40 mm	nr	6		-
J811.6	DN 50 mm	nr	12		-
	PN 16, DI Gate Valve. Epoxy Coated, Double Flanged, EPDM Rubber Seated, Dezincification Resitant Brass Wedgenut, Complete with approaching GI Flanges and all fittings (Genuine AVK)				
J811.8	DN 80 mm	nr	5		-
J811.9	DN 100 mm	nr	3		-
J811.10	DN 150 mm	nr	2		-
J84	**Butterfly Valves; Hand operated**				
	PN 16, DI, Concentric Butterfly Valve, Epoxy Coated, Double Flanged, Loose Liner, Gear Operated, Concentric Butterfly Valve, Complete with approaching GI flanges and all necessary fittings (AVK)				
J841.3	DN 150 mm	nr	1		-
J86	**Air Valves**				
	PN 16, Single Orifice - Nylon Combination Air Valve Assembly (ARI). Complete with approaching GI Flanges and all necessary fittings				
J861.1	DN 100mm mm	nr	8		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
J899	**Consumer Water Meter Reconection** *Supply fittings, relocate and install customer meters as per standard drawing 307-SD-07. Works to Include provision of Strainer and gatevalve. Works to include relocation and reinstallation of existing customer water meters.*				
J899.2	DN 20mm	nr	214		-
J899.3	DN 25mm	nr	92		-
J89	**Bulk Water Meter** *Supply and Install Flanged Zonal Water Meters, of Woltman type, R 250 and above. To Include water meter, Strainer, Fabricated Flanged Galvanized Iron Pipes and Flange Adaptors for respective meter installation.*				
J899.10	DN 150mm mm	nr	2		-
K	***CLASS K: Pipework – Manholes and Pipework Ancillaries***				
K1	**Manholes**				
K181.1	Provide materials and construct 1m x 1m Masonry manholes, depth not exceeding 1.5m, rate to include cover and frame	nr	25		-
K181.7	Provide materials and construct 1.5m x 1.5m Washout chamber, depth not exceeding 1.5m, complete with Washouts Assembly on 110mm Pipe. Include GI TEE, Flanged Connectors, gate Valves and other Fittings. As per Standard drawing XXXX. Rate to include cover and frame	nr	2		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
K6	**Crossings**				
K7101.1	Allow for diverting drains or waterways where they might interfere with the construction and reinstate these after construction of the water line has been completed. All waterways to be kept operational during construction.	LS	600		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
K8	**Marker Posts**				
K82.1	Excavate for, supply and fix concrete marker posts along the water line route, road crossings, change of direction and valve chambers at locations shown by the Engineer. All in accordance with details given in the standard drawings.	nr	50		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	COLLECTION SHEET				
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Bill NO. 4: Garden Estate Network					
ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	BILL 2: TRANSMISSION LINE WORKS *NOTES:* *Some of the sites have limited wayleaves. Contractors rates to allow for double haulage of excavated materials or any additional costs for execution of the works.* *The Contractor will be required to comply with environmental mitigation measures .* *Use of bulk excavation machines may not be possible within the site.* *The Contractor will be required to submit Method Statement for execution of works under these specific conditions for approval prior to execution of the works.* *No blasting will be permitted in the project areas* **CLASS A: GENERAL ITEMS**				
	Testing of Works				
A261.1	Allow for hydrostatic pressure testing, in accordance with clause 4.3.3 "Pipework testing" of the specification and to the satisfaction of the Engineer.	km	12.4128		-
	Disinfection of Pipelines:				
A260	Flushing with clear water, filling with water containing 0.05g/l calcium hypochlorite, left for 24 hours. This includes supply of necessary equipment, materials, chemicals and water, measurement of residual chlorine, all as specified and safe disposal of disinfecting water in accordance with clause 4.3.3 "Pipework testing" of the specification and to the satisfaction of the Engineer.	km	12.4128		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
A27	**Temporary Works**				
	Traffic Diversion				
A271.1	Allow for temporary works for diversion of traffic during construction of pipelines across roads, including sign posting, liaison with project affected persons, liaison with Traffic Police Department, Local Authority construction of diversion roads etc. all to the satisfaction of the Engineer. Include provision for maintaining temporary vehicular access to individual plots at all times.	LS	1		-
	Dewatering				
A276.1	Allow for keeping trenches and other excavation free of water which may have entered through ground seepage, rain or by other means in accordance with clause 2.3.6 "Pipework testing" of the specification and to the satisfaction of the Engineer.	m	10252.8		-
	Setting Out & Survey Work				
A278.1	Allow for Establishment of Level Datum, Setting Out of the Works and picking of levels after every 25m in all the Project Areas in accordance with the Specifications. This shall include staking out of the Pipeline Routes. Include for preparation and submission of Setting Out Survey Report to the Engineer for approval.	L.S	1		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	CLASS D: DEMOLITION AND SITE CLEARANCE				
D100	**General Clearance** *Includes: Demolition and removal of natural and artificial articles, objects and obstructions which are above the Original Surface* *Notes:* *The Employer has no available land to offer for dumping of spoil materials. Identification of and all accruing costs related to securing suitable area of land for dumping is the responsibility of the Contractor. Dumping and spreading is to be done in accordance with existing National Legislation and Local Authority's by-laws.* *The Contractor is deemed to have allowed for this aspect of Work in their excavation and cart away to tips rates.* ***General Clearance*** *The Contractor's rate for this item will be deemed to include for clearance of any extra land that he may consider necessary for execution of his Work and reinstatement of hedges and fences etc. removed during construction.*				
D100.1	*General Clearance*	ha	0.23		-
	PAGE TOTAL CARRIED TO Bill NO. 4 COLLECTION				-

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	Cutting of Trees				
D21.1	Provide all material and cut trees, girth measured 1m above ground level. Bushes are deemed to be included in Item D100.1. The disposal of trees shall be decided by the Engineer. The rate to include liaison with the relevant authorities and obtaining permission.	nr	2.00		-
	Removal of Tree Stumps				
D21.1	Allow for removal of stumps and backfilling holes with selected excavated material. Girth measured 1m above ground level. The rate shall also include disposal of stumps to tips identified by the Contractor in liaison with the Local Authority, all to the approval of the Engineer.	LS	1		-
	Demolition of structures				
D411	Allow for demolition and removal of structures. The rate shall also include storage demolished material and disposal of waste to tips identified by the Contractor in liaison with the Local Authority, all to the approval of the Engineer.	LS	1		-
D610	Demolition/ Dismantling and Relocation of Pipelines. Allow for demolition/dismantling, removal and relocation of pipelines. The rate shall also include transportation of demolished material to client's storage and disposal of waste to tips identified by the Contractor in liaison with the Local Authority, all to the approval of the Engineer.	m	124.128		-
	PAGE TOTAL CARRIED TO Bill NO. 4 COLLECTION				**-**

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	CLASS I: PIPEWORK - PIPES				
I0	**Pipe Excavation and Backfilling Works** *Rates under this section will be deemed to include:* *-Preparation and implementation of a traffic management plan to be submitted for approval by the Resident Engineer prior to commencement of works.* *-Informing immediate communities and stakeholders of the nature and timing of the excavation works.* *-Provision, erection and maintenance of barrier tapes, warning notices, safety signage, and public information displays at all affected locations.* *-Installation and maintenance of physical barriers along pedestrian walkways, crossings, and public spaces to ensure safety during excavation activities.* *-Use of warning signage and barrier tapes at open trenches and active excavation sites.* *-Employment and training of road safety marshalls responsible for on-site traffic management and pedestrian safety.* *-Application of dust suppression measures where excavation activities are likely to generate nuisance dust, including ensuring earth moving operations are conducted under damp conditions.* *-All labour, materials, equipment and incidentals necessary to comply with the above.* *Construction depths as:* *1200mm cover for Trunk Main Lines* *1000mm cover for Distribution Main lines* *800mm cover for Distribution Minor lines* *600mm cover for Service lines & Customer Connections* *200mm Bed depth for all pipes*				
I011.1	Excavate, backfill and compact pipeline trenchs for the following pipes; width to be 600mm or pipe Ø+400mm whichever is greater. Construction details as per standard drawing STD 11, Measurement details as per Class I of CESMM 4.	m	10252.8		-
I011.2	Extra over I011.1 in hard rock	m	3075.84		-
	PAGE TOTAL CARRIED TO Bill NO. 4 COLLECTION				**-**

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
I011.3	Excavate, backfill and compact consumer line trenches. Measurement details as per Class I of CESMM 4.	m	2160		-
I711	**High Density Polyethylene Pipes (HDPE)**				
	Includes Supply, Transport to site and Storage. *Notes:* *Pipe manufacture should be to KS - ISO 4427. All pipes to be butt-welded (Seamless). Repair of all pipes above OD 160mm to be joined by electrofusion.*				
	HDPE (PE100) (PN 16) for use with Butt Fusion (seamless) Jointing *Customer recconection pipes* *Supply and installation of HDPE pipework, including all bends, fittings, specials, warning tapes, testing of pipes and meters as specified, disinfection of pipes; covering also all necessary earthworks such as excavation, backfilling in maximum 30cm layers, bedding, compaction and crossings for other underground infrastructure, reinstatement of murram and concrete* *The item covers T pieces or saddles. Includes any additional excavation required for these items. Pipe trench dimensions, bedding layers etc., in line with the standard drawings and specifications.*				
I711.3	DN 20 mm	m	1512		-
I711.7	DN 25 (3/4") mm	m	648		-
	HDPE (PE100) (PN 10) for use with Butt Fusion (seamless) Jointing *Distribution lines pipes*				
I711.14	DN 32 (1") mm	m	1323.89		-
I711.28	DN 50 (1 1/2") mm	m	2245.73		-
I711.35	DN 63 (2") mm	m	1821.46		-
I711.49	DN 90 (3") mm	m	1839.04		-
I711.56	DN 110 (4") mm	m	1178.81		-
I711.63	DN 125 (5") mm	m	948.279		-
I711.77	DN 160 (6") mm	m	895.616		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	CLASS J: PIPEWORK— FITTINGS AND VALVES				
J6	**High density polyethylene pipe (HDPE) fittings**				
	Rates to include for provision and fixing. Flanges to PN 16 steel unless otherwise stated				
	High Density Polyethylene (HDPE) SDR 11 (PN 16) for with Butt Fusion (seamless) Jointing				
J61	**Bends Plain (Butt Fusion Fittings)**				
	Elbow				
J611.88	DN(90) mm 30°	nr	1		-
J611.92	DN(160) mm 30°	nr	1		-
J62	**Junctions and Branches (Butt Fussion Fittings)**				
	(PN16) Equal Tee				
J621.44	DN 32 mm 90°	nr	1		-
J621.46	DN 50 mm 90°	nr	2		-
J621.47	DN 63 mm 90°	nr	4		-
J621.49	DN 90 mm 90°	nr	1		-
J621.50	DN 110 mm 90°	nr	2		-
J621.52	DN 160 mm 90°	nr	1		-
	Reducing Tee				
J621.56	DN 50 / DN 40 mm 90°	nr	1		-
J621.59	DN 90 / DN 63 mm 90°	nr	8		-
J621.60	DN 110 / DN 63 mm 90°	nr	5		-
J621.62	DN 125 / DN 63 mm 90°	nr	9		-
J621.63	DN 125 / DN 90 mm 90°	nr	1		-
J621.65	DN 160 / DN 63 mm 90°	nr	1		-
J621.66	DN 160 / DN 90 mm 90°	nr	1		-
J621.68	DN 160 / DN 125 mm 90°	nr	1		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
J63	**Tapers (Butt Fussion Fittings)**				
	(PN16) Reducer				
J631.42	DN 50 / DN 32 mm	nr	6		-
J631.44	DN 63 / DN 32 mm	nr	10		-
J631.46	DN 63 / DN 50 mm	nr	12		-
J631.55	DN 90 / DN 50 mm	nr	1		-
J631.48	DN 90 / DN 63 mm	nr	3		-
J631.49	DN 110 / DN 63 mm	nr	2		-
J631.50	DN 110 / DN 90 mm	nr	3		-
J631.65	DN 125 / DN 110 mm	nr	2		-
J631.52	DN 160 / DN 90 mm	nr	1		-
J68	**Straight Specials (Butt Fussion Fittings)**				
	End Cap				
J681.10	DN 32mm	nr	12		-
J681.12	DN 50mm	nr	11		-
J681.13	DN 63mm	nr	2		-
J681.15	DN 90mm	nr	1		-
	PAGE TOTAL CARRIED TO Bill NO. 4 COLLECTION				-

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	Valves and penstocks				
J81	**Gate Valves; Hand operated**				
	Threaded Brass Gate Valve (PN16) Complete with all fittings as per the schedule "Section Valves at Take off Points' in drawing 303-SD-03. (Genuine Pegler)				
J811.3	DN 25 mm	nr	12		-
J811.6	DN 50 mm	nr	7		-
	PN 16, DI Gate Valve. Epoxy Coated, Double Flanged, EPDM Rubber Seated, Dezincification Resitant Brass Wedgenut, Complete with approaching GI Flanges and all fittings (Genuine AVK)				
J811.8	DN 80 mm	nr	3		-
J811.9	DN 100 mm	nr	3		-
J811.11	DN 125 mm	nr	1		-
J811.10	DN 150 mm	nr	2		-
J84	**Butterfly Valves; Hand operated**				
	PN 16, DI, Concentric Butterfly Valve, Epoxy Coated, Double Flanged, Loose Liner, Gear Operated, Concentric Butterfly Valve, Complete with approaching GI flanges and all necessary fittings (AVK)				
J841.1	DN 100 mm	nr	3		-
J86	**Air Valves**				
	PN 16, Single Orifice - Nylon Combination Air Valve Assembly (ARI). Complete with approaching GI Flanges and all necessary fittings				
J861.1	DN 50mm mm	nr	8		-
	PAGE TOTAL CARRIED TO Bill NO. 4 COLLECTION				-

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
J899	**Consumer Water Meter Reconection**				
	Supply fittings, relocate and install customer meters as per standard drawing 307-SD-07. Works to Include provision of Strainer and gatevalve. Works to include relocation and reinstallation of existing customer water meters.				
J899.2	DN 20mm	nr	151		-
J899.3	DN 25mm	nr	65		-
J89	**Bulk Water Meter**				
	Supply and Install Flanged Zonal Water Meters, of Woltman type, R 250 and above. To Include water meter, Strainer, Fabricated Flanged Galvanized Iron Pipes and Flange Adaptors for respective meter installation.				
J899.8	DN 80mm mm	nr	2		-
J899.10	DN 150mm mm	nr	1		-
K	***CLASS K: Pipework – Manholes and Pipework Ancillaries***				
K1	**Manholes**				
K181.1	Provide materials and construct 1m x 1m Masonry manholes, depth not exceeding 1.5m, rate to include cover and frame	nr	35		-
K181.7	Provide materials and construct 1.5m x 1.5m Washout chamber, depth not exceeding 1.5m, complete with Washouts Assembly on 110mm Pipe. Include GI TEE, Flanged Connectors, gate Valves and other Fittings. As per Standard drawing XXXX. Rate to include cover and frame	nr	2		-
	PAGE TOTAL CARRIED TO Bill NO. 4 COLLECTION				-

ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
K6	**Crossings**				
K611.1	Allow for river crossings excluding pipe, length in accordance to Drawing 305-SD-05	nr	1		-
K69	**Micro-tunneling below bituminous roads**				
	Rates quoted shall be deemed to include for costs incurred on traffic control, signage and safety measures during execution of the works. All in accordance with details given in the standard drawings.				
K691.1	Allow for micro-tunneling below bituminous roads, and reinstate these after construction of the water line has been completed.	m	1		-
K79	**Breaking up temporary and permanent reinstatement of paved footpaths (concrete, cabro, tarmac, etc.).**				
	Breaking up, temporary and permanent reinstatement of roads with 300mm thick well graded stabilised gravel with 3% cement content base compacted using a 8-10 tonne roller to the satisfaction of the Engineer .				
	Works to include provision of DN 200 mm upvc pipe PN8 with 150mm thich mass concrete class 15/20 surround for road crossings as per standard drawing XXXX.				
	Contractor to allow for liaison with relevant local authorities and obtaining approval for completed works in his rates.				
	Rates quoted shall be deemed to include for costs incurred on traffic control, signage and safety measures during execution of the works. All in accordance with details given in the standard drawings.				
K791.1	Reinstatement of paved areas. Pipe bore Not exceeding 300mm	m	40		-
K791.2	Reinstatement of unpaved areas (murrum road crossing). Pipe bore Not exceeding 300mm	m	180		-
K7101.1	Allow for diverting drains or waterways where they might interfere with the construction and reinstate these after construction of the water line has been completed. All waterways to be kept operational during construction.	LS	600		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
K8	**Marker Posts**				
K82.1	Excavate for, supply and fix concrete marker posts along the water line route, road crossings, change of direction and valve chambers at locations shown by the Engineer. All in accordance with details given in the standard drawings.	nr	40		-
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ITEM NO.	DESCRIPTION	UNIT	QTY	Rate (Ksh.)	Amount (Ksh.)
	COLLECTION SHEET				
	Total Page 1				-
	Total Page 2				-
	Total Page 3				-
	Total Page 4				-
	Total Page 5				-
	Total Page 6				-
	Total Page 7				-
	Total Page 8				-
	Total Page 9				-
	Total Page 10				-
	Total Page 11				-
	Total Page 12				-
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PART III - CONDITIONS OF CONTRACT AND CONTRACT FORMS

SECTION VIII - GENERAL CONDITIONS OF CONTRACT

General Conditions of Contract

A. General

1. Definitions

1.1 Bold face type is used to identify defined terms.

a) **The Accepted Contract** Amount means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.

b) **The Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events.

c) **The Adjudicator** is the person appointed jointly by the Procuring Entity and the Contractor to resolve disputes in the first instance, as provided for in GCC 23.

d) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid.

e) **Compensation Events** are those defined in GCC Clause 42 hereunder.

f) **The Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC Sub-Clause 53.1.

g) **The Contract** is the Contract between the Procuring Entity and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC Sub-Clause 2.3 below.

h) **The Contractor** is the party whose Bid to carry out the Works has been accepted by the Procuring Entity.

i) **The Contractor's Bid** is the completed bidding document submitted by the Contractor to the Procuring Entity.

j) **The Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.

k) **Days** are calendar days; months are calendar months.

l) **Day work**s are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.

m) **A Defect** is any part of the Works not completed in accordance with the Contract.

n) **The Defects** Liability Certificate is the certificate issued by Project Manager upon correction of defects by the Contractor.

o) **The Defects Liability Period** is the period **named in the SCC** pursuant to Sub-Clause 34.1 and calculated from the Completion Date.

p) **Drawings** means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Procuring Entity in accordance with the Contract, include calculations and other information provided or approved by the Project Manager for the execution of the Contract.

q) **The Procuring Entity** is the party who employs the Contractor to carry out the Works, **as specified in the SCC,** who is also the Procuring Entity.

r) **Equipmen**t is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

s) **"In writing" or "written"** means hand-written, type-written, printed or electronically made, and resulting in a permanent record;

t) The Initial Contract Price is the Contract Price listed in the Procuring Entity's Letter of Acceptance.

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

v) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.

w) **Plant i**s any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.

x) **The Project Manager** is the person **named in the SCC** (or any other competent person appointed by the Procuring Entity and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.

y) **SCC** means Special Conditions of Contract.

z) **The Site** is the area of the works as **defined as such in the SCC**.

aa) **Site Investigation Reports** are those that were included in the bidding document and are factual and interpretative reports about the surface and subsurface conditions at the Site.

bb) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

cc) **The Start Date** is **given in the SCC**. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.

dd) **A Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.

ee) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.

ff) **A Variation** is an instruction given by the Project Manager which varies the Works.

gg) **The Works** are what the Contract requires the Contractor to construct, install, and turn over to the Procuring Entity, **as defined in the SCC**.

2. Interpretation

2.1 In interpreting these GCC, words indicating one gender include all genders. Words indicating the singular also include the plural and words indicating the plural also include the singular. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.

2.2 If sectional completion is specified in the SCC, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

2.3 The documents forming the Contract shall be interpreted in the following order of priority:

a) Agreement,
b) Letter of Acceptance,
c) Contractor's Bid,
d) Special Conditions of Contract,
e) General Conditions of Contract, including Appendices,
f) Specifications,
g) Drawings,
h) Bill of Quantities, and
i) Any other document **listed in the SCC** as forming part of the Contract.

3. Language and Law

3.1 The language of the Contract is English Language and the law governing the Contract is the Laws of Kenya.

3.2 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Procuring Entity's Country when

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 from that country or any payments to any country, person, or entity in that country.

4. Project Manager's Decisions

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

5. Delegation

5.1 Otherwise **specified in the SCC,** the Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may revoke any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Procuring Entity in writing. Subcontracting shall not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Procuring Entity between the dates given in the Schedule of Other Contractors, as **referred to in the SCC.** The Contractor shall also provide facilities and services for them as described in the Schedule. The Procuring Entity may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.

9. Personnel and Equipment

9.1 The Contractor shall employ the key personnel and use the equipment identified in its Bid, to carry out the Works or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid.

9.2 If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

9.3 If the Procuring Entity, Project Manager or Contractor determines, that any employee of the Contractor be determined to have engaged in Fraud and Corruption during the execution of the Works, then that employee shall be removed in accordance with Clause 9.2 above.

10. Procuring Entity's and Contractor's Risks

10.1 The Procuring Entity carries the risks which this Contract states are Procuring Entity's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Procuring Entity's Risks

11.1 From the Start Date until the Defects Liability Certificate has been issued, the following are Procuring Entity's risks:

a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to
   i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or
   ii) Negligence, breach of statutory duty, or interference with any legal right by the Procuring Entity or by any person employed by or contracted to him except the Contractor.

b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Procuring Entity or in the Procuring Entity's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

11.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is a Procuring Entity's risk except loss or damage due to

aa) a Defect which existed on the Completion Date,

bb) an event occurring before the Completion Date, which was not itself a Procuring Entity's risk, or

cc) The activities of the Contractor on the Site after the Completion Date.

12. Contractor's Risks

12.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Procuring Entity's risks are Contractor's risks.

13. Insurance

13.1 The Contractor shall provide, in the joint names of the Procuring Entity and the Contractor, insurance cover **from the Start Date to the end of the Defects Liability Period**, in the amounts and deductibles **stated in the SCC** for the following events which are due to the Contractor's risks:

a) loss of or damage to the Works, Plant, and Materials;

b) loss of or damage to Equipment;

c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and

d) personal injury or death.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Procuring Entity may effect the insurance which the Contractor should have provided and recover the premiums the Procuring Entity has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager.

13.5 Both parties shall comply with any conditions of the insurance policies.

14. Site Data

14.1 The Contractor shall be deemed to have examined any Site Data **referred to in the SCC**, supplemented by any information available to the Contractor.

15. Contractor to Construct the Works

15.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.

16. The Works to Be Completed by the Intended Completion Date

16.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.

17. Approval by the Project Manager

17.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, for his approval.

17.2 The Contractor shall be responsible for design of Temporary Works.

17.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

17.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.

17.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use.

18. Safety

18.1 The Contractor shall be responsible for the safety of all activities on the Site.

19. Discoveries

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

20. Possession of the Site

20.1 The Procuring Entity shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date **stated in the SCC,** the Procuring Entity shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.

21. Access to the Site

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

22. Instructions, Inspections and Audits

22.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.

22.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and sub-consultants to keep, accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs.

22.3 The Contractor shall permit and shall cause its subcontractors and sub-consultants to permit, the Procuring Entity and/or persons appointed by the Public Procurement Regulatory Authority to inspect the Site and/or the accounts and records relating to the procurement process, selection and/or contract execution, and to have such accounts and records audited by auditors appointed by the Public Procurement Regulatory Authority. The Contractor's and its Subcontractors' and sub-consultants' attention is drawn to Sub-Clause 25.1 (Fraud and Corruption) which provides, inter alia, that acts intended to materially impede the exercise of the Public Procurement Regulatory Authority's inspection and audit rights constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Public Procurement Regulatory Authority's prevailing sanctions procedures).

23. Appointment of the Adjudicator

23.1 The Adjudicator shall be appointed jointly by the Procuring Entity and the Contractor, at the time of the Procuring Entity's issuance of the Letter of Acceptance. If, in the Letter of Acceptance, the Procuring Entity does not agree on the appointment of the Adjudicator, the Procuring Entity will request the Appointing Authority designated in the SCC, to appoint the Adjudicator within 14 days of receipt of such request.

23.2 Should the Adjudicator resign or die, or should the Procuring Entity and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Procuring Entity and the Contractor. In case of disagreement between the Procuring Entity and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority designated in the SCC at the request of either party, within 14 days of receipt of such request.

24. Settlement of Claims and Disputes

24.1 Contractor's Claims

24.1.1 If the Contractor considers itself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give **Notice to the Project Manager**, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 30 days after the Contractor became aware, or should have become aware, of the event or circumstance.

24.1.2 If the Contractor fails to give notice of a claim within such period of 30 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Procuring Entity shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub- Clause shall apply.

24.1.3 The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

24.1.4 The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Project Manager. Without admitting the Procuring Entity's liability, the Project Manager may, after receiving any notice under this Sub-Clause, monitor the record- keeping and/or instruct the Contractor to keep further contemporary records. The Contractor shall permit the Project Manager to inspect all these records, and shall (if instructed) submit copies to the Project Manager.

24.1.5 Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the

Project Manager, the Contractor shall send to the Project Manager a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:

a) this fully detailed claim shall be considered as interim;

b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Project Manager may reasonably require; and

c) the Contractor shall send a final claim within 30 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Project Manager.

24.1.6 Within 42 days after receiving a Notice of a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Project Manager and approved by the Contractor, the Project Manager shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within the above defined time period.

24.1.7 Within the above defined period of 42 days, the Project Manager shall proceed in accordance with Sub-Clause

24.1.8 [Determinations] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause 8.4 [Extension of Time for Completion], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

24.1.9 Each Payment Certificate shall include such additional payment for any claim as has been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

24.1.10 If the Project Manager does not respond within the timeframe defined in this Clause, either Party may consider that the claim is rejected by the Project Manager and any of the Parties may refer to Arbitration in accordance with Sub-Clause 24.4 [Arbitration].

24.1.11 The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause 24.3.

242 Amicable Settlement

24.2.1 Where a notice of a claim has been given, both Parties shall attempt to settle the dispute amicably before the commencement of arbitration. However, unless both Parties agree otherwise, the Party giving a notice of a claim in accordance with Sub-Clause 24.1 above should move to commence arbitration after the fifty-sixth day from the day on which a notice of a claim was given, even if no attempt at an amicable settlement has been made.

243 Matters that may be referred to arbitration

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

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

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

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

e) Any dispute arising in respect of war risks or war damage.

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

24.4 Arbitration

24.4.1 Any claim or dispute between the Parties arising out of or in connection with the Contract not settled amicably in accordance with Sub-Clause 24.3 shall be finally settled by arbitration.

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

24.4.3 Notwithstanding the issue of a notice as stated above, the arbitration of such a claim or dispute shall not commence unless an attempt has in the first instance been made by the parties to settle such claim or dispute amicably with or without the assistance of third parties. Proof of such attempt shall be required.

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

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

24.4.6 The arbitrators shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of the Project Manager, relevant to the dispute. Nothing shall disqualify representatives of the Parties and the Project Manager from being called as a witness and giving evidence before the arbitrators on any matter whatsoever relevant to the dispute.

24.4.7 Neither Party shall be limited in the proceedings before the arbitrators to the evidence, or to the reasons for dissatisfaction given in its Notice of Dissatisfaction.

24.4.8 Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties, and the Project Manager shall not be altered by reason of any arbitration being conducted during the progress of the Works.

24.4.9 The terms of the remuneration of each or all the members of Arbitration shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.

24.5 Arbitration with National Contractors

24.5.1 If the Contract is with national contractors, arbitration proceedings will be conducted in accordance with the Arbitration Laws of Kenya. In case of any claim or dispute, such claim or dispute shall be notified in writing by either party to the other with a request to submit it to arbitration and to concur in the appointment of an Arbitrator within thirty days of the notice. The dispute shall be referred to the arbitration and final decision of a person to be agreed between the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointed, on the request of the applying party, by the Chairman or Vice Chairman of any of the following professional institutions;

i) Architectural Association of Kenya

ii) Institute of Quantity Surveyors of Kenya

iii) Association of Consulting Engineers of Kenya

iv) Chartered Institute of Arbitrators (Kenya Branch)

v) Institution of Engineers of Kenya

24.5.2 The institution written to first by the aggrieved party shall take precedence over all other institutions.

24.6 Alternative Arbitration Proceedings

24.6.1 Alternatively, the Parties may refer the matter to the Nairobi Centre for International Arbitration (NCIA) which offers a neutral venue for the conduct of national and international arbitration with commitment to providing institutional support to the arbitral process.

24.7 Failure to Comply with Arbitrator's Decision

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

24.7.2 In the event that a Party fails to comply with a final and binding Arbitrator's decision, then the other Party may, without prejudice to any other rights it may have, refer the matter to a competent court of law.

24.8 Contract operations to continue

24.8.1 Notwithstanding any reference to arbitration herein,

a) the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and
b) the Procuring Entity shall pay the Contractor any monies due the Contractor.

25. Fraud and Corruption

25.1 The Government requires compliance with the country's Anti-Corruption laws and its prevailing sanctions policies and procedures as set forth in the Constitution of Kenya and its Statutes.

25.2 The Procuring Entity requires the Contractor to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.

B. Time Control

26. Program

26.1 Within the time stated in the SCC, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule.

26.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.

26.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period stated in the SCC. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount stated in the SCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of a lump sum contract, the Contractor shall provide an updated Activity Schedule within 14 days of being instructed to by the Project Manager.

26.4 The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.

27. Extension of the Intended Completion Date

27.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.

27.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

28. Acceleration

28.1 When the Procuring Entity wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Procuring Entity accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Procuring Entity and the Contractor.

28.2 If the Contractor's priced proposals for an acceleration are accepted by the Procuring Entity, they are incorporated in the Contract Price and treated as a Variation.

29. Delays Ordered by the Project Manager

29.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.

30. Management Meetings

30.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

30.2 The **Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Procuring Entity**. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

31. Early Warning

31.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.

31.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

C. Quality Control

32. Identifying Defects

32.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.

33. Tests

33.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.

34. Correction of Defects

34.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the SCC. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

34.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.

35. Uncorrected Defects

35.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.

D. Cost Control

36. Contract Price[7]

36.1 The Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.

37. Changes in the Contract Price[8]

37.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Procuring Entity.

37.2 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.

38. Variations

38.1 All Variations shall be included in updated Programs produced by the Contractor.

38.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

38.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.

38.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

38.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning

38.6 If the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in Sub-Clause 39.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work

38.7 Value Engineering: The Contractor may prepare, at its own cost, a value engineering proposal at any time during the performance of the contract. The value engineering proposal shall, at a minimum, include the following;

a) the proposed change(s), and a description of the difference to the existing contract requirements;
b) a full cost/benefit analysis of the proposed change(s) including a description and estimate of costs (including life cycle costs) the Procuring Entity may incur in implementing the value engineering proposal; and
c) a description of any effect(s) of the change on performance/functionality.

38.8 The Procuring Entity may accept the value engineering proposal if the proposal demonstrates benefits that:

a) accelerate the contract completion period; or
b) reduce the Contract Price or the life cycle costs to the Procuring Entity; or
c) improve the quality, efficiency, safety or sustainability of the Facilities; or
d) yield any other benefits to the Procuring Entity, without compromising the functionality of the Works.

38.9 If the value engineering proposal is approved by the Procuring Entity and results in:

a) a reduction of the Contract Price; the amount to be paid to the Contractor shall be the **percentage specified in the SCC** of the reduction in the Contract Price; or
b) an increase in the Contract Price; but results in a reduction in life cycle costs due to any benefit described in (a) to (d) above, the amount to be paid to the Contractor shall be the full increase in the Contract Price.

39. Cash Flow Forecasts

39.1 When the Program[11], is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.

40. Payment Certificates

40.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

40.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.

40.3 The value of work executed shall be determined by the Project Manager.

40.4 The value of work executed shall comprise the value of the quantities of work in the Bill of Quantities that have been completed12.

40.5 The value of work executed shall include the valuation of Variations and Compensation Events.

40.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

40.7 Where the contract price is different from the corrected tender price, in order to ensure the contractor is not paid less or more relative to the contract price (which would be the tender price), payment valuation certificates and variation orders on omissions and additions valued based on rates in the Bill of Quantities or schedule of rates in the Tender, will be adjusted by a plus or minus percentage. The percentage already worked out during tender evaluation is worked out as follows: *(corrected tender price – tender price)/tender price X 100*.

41. Payments

41.1 Payments shall be adjusted for deductions for advance payments and retention. The Procuring Entity shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of each certificate. If the Procuring Entity makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made.

41.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

41.3 Unless otherwise stated, all payments and deductions shall be paid or charged in the proportions of currencies comprising the Contract Price.

41.4 Items of the Works for which no rate or price has been entered in shall not be paid for by the Procuring Entity and shall be deemed covered by other rates and prices in the Contract.

42. Compensation Events

42.1 The following shall be Compensation Events:

d) The Procuring Entity does not give access to a part of the Site by the Site Possession Date pursuant to GCC Sub-Clause 20.1.

e) The Procuring Entity modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.

f) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.

g) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.

h) The Project Manager unreasonably does not approve a subcontract to be let.

i) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.

j) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Procuring Entity, or additional work required for safety or other reasons.

k) Other contractors, public authorities, utilities, or the Procuring Entity does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

l) The advance payment is delayed.

m) The effects on the Contractor of any of the Procuring Entity's Risks.

n) The Project Manager unreasonably delays issuing a Certificate of Completion.

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

42.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.

42.4 The Contractor shall not be entitled to compensation to the extent that the Procuring Entity's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.

43. Tax

43.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 30 days before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC Clause 44.

44. Currency y of Payment

44.1 All payments under the contract shall be made in Kenya Shillings

45. Price Adjustment

45.1 Prices shall be adjusted for fluctuations in the cost of inputs only if **provided for in the SCC.** If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due in each currency. A separate formula of the type specified below applies:

P = A + B Im/Io

where:

P is the adjustment factor for the portion of the Contract Price payable.

A and B are coefficients[13] **specified in the SCC,** representing the non-adjustable and adjustable portions, respectively, of the Contract Price payable and Im is the index prevailing at the end of the month being invoiced and IOC is the index prevailing 30 days before Bid opening for inputs payable.

45.2 If the value of the index is changed after it has been used in a calculation, the calculation shall be corrected and an adjustment made in the next payment certificate. The index value shall be deemed to take account of all changes in cost due to fluctuations in costs.

46. Retention

46.1 The Procuring Entity shall retain from each payment due to the Contractor the proportion stated in the **SCC** until Completion of the whole of the Works.

46.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with GCC 53.1, half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected. The Contractor may substitute retention money with an "on demand" Bank guarantee.

47. Liquidated Damages

47.1 The Contractor shall pay liquidated damages to the Procuring Entity at the rate per day stated in the **SCC** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the SCC. The Procuring Entity may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

47.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC Sub-Clause 41.1.

48. Bonus

48.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day **stated in the SCC** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.

49. Advance Payment

49.1 The Procuring Entity shall make advance payment to the Contractor of the amounts stated in the **SCC** by the date stated in the **SCC**, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Procuring Entity in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.

49.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.

49.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.

50. Securities

50.1 The Performance Security shall be provided to the Procuring Entity no later than the date specified in the Letter of Acceptance and shall be issued in an amount **specified in the SCC,** by a bank or surety acceptable to the Procuring Entity, and denominated in the types and proportions of the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 day from the date of issue of the Certificate of Completion in the case of a Bank Guarantee, and until one year from the date of issue of the Completion Certificate in the case of a Performance Bond.

51. Dayworks

51.1 If applicable, the Dayworks rates in the Contractor's Bid shall be used only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.

51.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.

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

52. Cost of Repairs

52.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E Finishing the Contract

53. Completion

53.1 The Contractor shall request the Project Manager to issue a Certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the whole of the Works is completed.

54. Taking Over

54.1 The Procuring Entity shall take over the Site and the Works within seven days of the Project Manager's issuing a certificate of Completion.

55. Final Account

55.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.

56. Operating and Maintenance Manuals

56.1 If “as built” Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the SCC.

56.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the SCC pursuant to GCC Sub-Clause 56.1, or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount **stated in the SCC** from payments due to the Contractor.

57. Termination

57.1 The Procuring Entity or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

57.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:

a) the Contractor stops work for 30 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;

b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 30 days;

c) the Procuring Entity or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

d) a payment certified by the Project Manager is not paid by the Procuring Entity to the Contractor within 84 days of the date of the Project Manager's certificate;

e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;

f) the Contractor does not maintain a Security, which is required;

g) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as **defined in the SCC**; or

h) if the Contractor, in the judgment of the Procuring Entity has engaged in Fraud and Corruption, as defined in paragraph 2.2 a of the Appendix A to the GCC, in competing for or in executing the Contract, then the Procuring Entity may, after giving fourteen (14) days written notice to the Contractor, terminate the Contract and expel him from the Site.

57.3 Notwithstanding the above, the Procuring Entity may terminate the Contract for convenience.

57.4 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

57.5 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC Sub-Clause 56.2 above, the Project Manager shall decide whether the breach is fundamental or not.

58. Payment upon Termination

58.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as specified in the SCC. Additional Liquidated Damages shall not apply. If the total amount due to the Procuring Entity exceeds any payment due to the Contractor, the difference shall be a debt payable to the Procuring Entity.

58.2 If the Contract is terminated for the Procuring Entity's convenience or because of a fundamental breach of Contract by the Procuring Entity, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.

59. Property

59.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Procuring Entity if the Contract is terminated because of the Contractor's default.

60. Release from Performance

60.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Procuring Entity or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.

SECTION IX - SPECIAL CONDITIONS OF CONTRACT

Number of GC Clause	Amendments of, and Supplements to, Clauses in the General Conditions of Contract
A. General	
GCC 1.1 (q)	The Procuring Entity is: **Nyahururu Water and Sanitation Company (NYAHUWASCO)**
GCC 1.1 (u)	The Intended Completion Date for the whole of the Works shall **be Nine months after signing** of contracts. (**six months** construction works, **three months** defect liability period)
GCC 1.1 (x)	The Project Manager is **Technical Services manager** **Nyahururu Water and Sanitation Company Limited** **P.O.BOX 952-20300** **NYAHURURU**
GCC 1.1 (z)	The Site is located Nyahururu Municipality;: a) **Lumumba, Site Phase I, Kiano And Upper Coresite** and is defined in drawings **b) Lower Coresite** and is defined in drawings **c) Garden Estate** and is defined in drawings
GCC 1.1 (cc)	The Start Date shall be **Upon signing of contract**
GCC 1.1 (gg)	The Works consist of; **i) Clearing Pipelines sites** **ii) Excavating, backfilling and compacting pipeline trench** **iii) Supplying, handling, transporting, laying and testing the pipes including cutting to size, fixing and jointing and laying in suitable soft bedding material**
GCC 2.2	Sectional Completions are: **Not Applicable**
GCC 5.1	The Project manager **may delegate** any of his duties and responsibilities.
GCC 8.1	Schedule of other contractors **Not Applicable**
GCC 9.1	**Key Personnel** GCC 9.1 is replaced with the following: 9.1 Key Personnel are the Contractor's personnel named in this GCC 9.1 of the Special Conditions of Contract. The Contractor shall employ the Key Personnel and use the equipment identified in its Bid, to carry out the Works or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of Key Personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid. **[insert the name/s of each Key Personnel agreed by the Procuring Entity prior to Contract signature.]**
GCC 13.1	The minimum insurance amounts and deductibles shall be: **as indicated in the BOQs**
GCC 14.1	Site Data are: will be as provided in the contract document
GCC 20.1	The Site Possession Date(s) shall be as agreed during commencement meeting
GCC 23.1 & GCC 23.2	Appointing Authority for the Adjudicator : **Nairobi Center for International Arbitration (NCIA)**
	Hourly rate and types of reimbursable expenses to be paid to the Adjudicator: **As it shall be agreed upon by both parties**

Number of GC Clause	Amendments of, and Supplements to, Clauses in the General Conditions of Contract
B. Time Control	
GCC 26.1	The Contractor shall submit for approval a Program for the Works within Seven (7) days from the date of the Letter of Acceptance.
GCC 26.3	The period between Program updates is Seven (7) days. The amount to be withheld for late submission of an updated Program is as prescribed in the contract
C. Quality Control	
GCC 34.1	The Defects Liability Period is: **3 months.**
D. Cost Control	
GCC 38.9	If the value engineering proposal is approved by the Procuring Entity the amount to be paid to the Contractor shall be *N/A % (insert appropriate percentage. The percentage is normally up to 50%)* of the reduction in the Contract Price.
GCC 44.1	The currency of the Procuring Entity's Country is: ***Kenya Shillings***
GCC 45.1	The Contract **is not subject to price adjustment** in accordance with GCC Clause 45, and the following information regarding coefficients **does not apply**. The coefficients for adjustment of prices are: **Not applicable** (a) *[insert percentage]* percent nonadjustable element (coefficient A). (b) *[insert percentage]* percent adjustable element (coefficient B). (c) The Index I for shall be *[insert index]*.
GCC 46.1	The proportion of payments retained is **10%**
GCC 47.1	The liquidated damages for the whole of the Works are 0.05 percent of the final Contract Price per day. The maximum amount of liquidated damages for the whole of the Works is 10% of the final Contract Price.
GCC 48.1	The Bonus for the whole of the Works **Not applicable** per day. The maximum amount of Bonus for the whole of the Works **Not applicable***]* of the final Contract Price.
GCC 49.1	The Advance Payments shall be **NO ADVANCE PAYMENT**
GCC 50.1	The Performance Security amount is **10%** of the final contract price
E. Finishing the Contract	
GCC 56.1	The date by which operating and maintenance manuals are required is **one month after completion of construction works** The date by which "as built" drawings are required is **one month after completion of construction works**
GCC 56.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required in GCC 58.1 is as will be prescribed in the contract
GCC 57.2 (g)	The maximum number of days is: as will be prescribed in the contract
GCC 58.1	The percentage to apply to the value of the work not completed, representing the Procuring Entity's additional cost for completing the Works, **is as will be prescribed in the contract.**

FORM NO 1: NOTIFICATION OF INTENTION TO AWARD

This Notification of Intention to Award shall be sent to each Tenderer that submitted a Tender. Send this Notification to the Tenderer's Authorized Representative named in the Tender Information Form on the format below.

FORMAT

1.For the attention of Tenderer's Authorized Representative

i) Name: *[insert Authorized Representative's name]*

ii) Address: *[insert Authorized Representative's Address]*

iii) Telephone: *[insert Authorized Representative's telephone/fax numbers]*

iv) 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.]

2.Date of transmission: [*email*] on [*date*] (local time)

This Notification is sent by (*Name and designation*) _____

3.Notification of Intention to Award

i) Procuring Entity: *[insert the name of the Procuring Entity]*

ii) Project: *[insert name of project]*

iii) Contract title: *[insert the name of the contract]*

iv) Country: *[insert country where ITT is issued]*

v) ITT No: *[insert ITT reference number from Procurement Plan]*

This Notification of Intention to Award (Notification) notifies you of our decision to award the above contract. The transmission of this Notification begins the Standstill Period. During the Standstill Period, you may:

4.Request a debriefing in relation to the evaluation of your tender

Submit a Procurement-related Complaint in relation to the decision to award the contract.

a) The successful tenderer

i) Name of successful Tender_____

ii) Address of the successful Tender _____

iii) Contract price of the successful Tender Kenya Shillings _____ (in words_____)

b) Other Tenderers

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. For Tenders not evaluated, give one main reason the Tender was unsuccessful.

SNo	Name of Tender	Tender Price as read out	Tender's evaluated price (Note a)	One Reason Why not Evaluated
1				
2				

3				
4				
5				

(Note a) State NE if not evaluated

5. How to request a debriefing?

a) DEADLINE: The deadline to request a debriefing expires at midnight on [*insert date*] (*local time*).

b) 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 (5) Business Days of receipt of this Notification of Intention to Award.

c) Provide the contract name, reference number, name of the Tenderer, contact details; and address the request for debriefing as follows:

i) Attention: [*insert full name of person, if applicable*]

ii) Title/position: [*insert title/position*]

ii) Agency: [*insert name of Procuring Entity*]

iii) Email address: [*insert email address*]

d) If your request for a debriefing is received within the 3 Days deadline, we will provide the debriefing within five (3) 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 (3) 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.

e) 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.

f) 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) Days from the date of publication of the Contract Award Notice.

6. How to make a complaint

a) Period: Procurement-related Complaint challenging the decision to award shall be submitted by midnight, [*insert date*] (local time).

b) Provide the contract name, reference number, name of the Tenderer, contact details; and address the Procurement-related Complaint as follows:

i) Attention: [*insert full name of person, if applicable*]

ii) Title/position: [*insert title/position*]

iii) Agency: [*insert name of Procuring Entity*]

iv) Email address: [*insert email address*]

c) 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.

d) Further information: For more information refer to the Public Procurement and Disposals Act 2015 and its Regulations available from the Website info@ppra.go.ke or complaints@ppra.go.ke.

You should read these documents before preparing and submitting your complaint.

e) There are four essential requirements:

i) 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.

ii) The complaint can only challenge the decision to award the contract.

iii) You must submit the complaint within the period stated above.

iv) You must include, in your complaint, all of the information required to support your complaint.

7.Standstill Period

i) DEADLINE: The Standstill Period is due to end at midnight on [*insert date*] (local time).

ii) The Standstill Period lasts ten (14) Days after the date of transmission of this Notification of Intention to Award.

iii) The Standstill Period may be extended as stated in paragraph Section 5 (d) above.

If you have any questions regarding this Notification please do not hesitate to contact us. On behalf of the Procuring Entity:

Signature:_____ Name:_____ Title/position:_

_____ Telephone:___ Email: _____

FORM NO 2: REQUEST FOR REVIEW

FORM FOR REVIEW (r.203(1))

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PUBLIC PROCUREMENT ADMINISTRATIVE REVIEW BOARD

APPLICATION NO……. OF…….….20……...

BETWEEN

……...……. APPLICANT

AND

……RESPONDENT (Procuring Entity)

Request for review of the decision of the…… (Name of the Procuring Entity of ……dated the…day of ……20…….in the matter of Tender No……..…of ……20…. for .....(Tender description).

REQUEST FOR REVIEW

I/We……, the above named Applicant(s), of address: Physical address……. P. O. Box No……. Tel. No……. Email ……, hereby request the Public Procurement Administrative Review Board to review the whole/part of the above mentioned decision on the following grounds, namely:

1.

2.

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

1.

2.

SIGNED ……. (Applicant) Dated on……. day of ……/…20……

FOR OFFICIAL USE ONLY Lodged with the Secretary Public Procurement Administrative Review Board on……day of ……....20….……

SIGNED

Board Secretary

FORM NO 3: LETTER OF AWARD

[letterhead paper of the Procuring Entity] [date]

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 Contract Data]* 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 …… (*name of Procuring Entity)*.

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 VIII, Contract Forms, of the Tender Document.

Authorized Signature: .....

Name and Title of Signatory: .....

Name of Procuring Entity.....

Attachment: *Contract Agreement*.....

FORM NO 4: CONTRACT AGREEMENT

THIS AGREEMENT made the_____day of_____, 20____, between _____of _____ (hereinafter "the Procuring Entity"), of the one part, and_____of_____(hereinafter "the Contractor"), of the other part:

WHEREAS the Procuring Entity desires that the Works known as_____should be executed by the Contractor, and has accepted a Tender by the Contractor for the execution and completion of these Works and the remedying of any defects therein,

The Procuring Entity and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.

a) the Letter of Acceptance
b) the Letter of Tender
c) the addenda Nos_____(if any)
d) the Special Conditions of Contract
e) the General Conditions of Contract;
f) the Specifications
g) the Drawings; and
h) the completed Schedules and any other documents forming part of the contract.

3. In consideration of the payments to be made by the Procuring Entity to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Procuring Entity to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Procuring Entity hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the Laws of Kenya on the day, month and year specified above.

Signed and sealed by_____(for the Procuring Entity)

Signed and sealed by_____(for the Contractor).

FORM NO 5: PERFORMANCE SECURITY

[Option 1 - Unconditional Demand Bank Guarantee]

[Guarantor letterhead]

Beneficiary:_____*[insert name and Address of* Procuring Entity*]* **Date:**_____

_____*[Insert date of issue]*

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

1.We have been informed that_____(hereinafter called "the Contractor") has entered into Contract No._____dated_____with (*name of Procuring Entity*)_____(the Procuring Entity as the Beneficiary), for the execution of _____(hereinafter called "the Contract").

2.Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

3.At the request of the Contractor, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of (in words),1 such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

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 the office indicated above on or before that date.

5.The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed *[six months] [one year],* in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

[Name of Authorized Official, signature(s) and seals/stamps].

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

[1] *The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency 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.*

FORM NO 6: 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 letterhead]*

1. By this Bond _____ as Principal (hereinafter called "the Contractor") and _____] as Surety (hereinafter called "the Surety"), are held and firmly bound unto _____] as Obliged (hereinafter called "the Procuring Entity") in the amount of _____ for the payment of which sum well and truly to be made in the types and proportions of currencies in which the Contract Price is payable, the Contractor and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

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 herein provided for, are by reference made part hereof and are hereinafter 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 thereunder, the Surety may promptly remedy the default, or shall promptly:

1) complete the Contract in accordance with its terms and conditions; or

2) obtain a 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 up to 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 herein or the heirs, executors, administrators, successors, and assigns of the Procuring Entity.

6. In testimony whereof, the Contractor has hereunto set his hand and affixed his seal, and the Surety has caused these presents to be sealed with his corporate seal duly attested by the signature of his legal representative, this day ___ of _____ 20_____.

SIGNED ON _____ on behalf of by ___ in the capacity of in the presence of

SIGNED ON _____ on behalf of by ___ in the capacity of in the presence of

FORM NO 7: ADVANCE PAYMENT SECURITY

[Demand Bank Guarantee]

[Guarantor letterhead]

Beneficiary:_____*[Insert name and Address of* Procuring Entity*]*
Date:_____*[Insert date of issue]*

ADVANCE PAYMENTGUARANTEE 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_____ _(hereinafter called "the Contractor") has entered into Contract No._____*dated*_ _with the Beneficiary, for the execution of _____ (hereinafter called "the Contract").

2.Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum _____(*in words*) is to be made against an advance payment 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_(*in words*___)[1] upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or

b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

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 Contractor 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 Contractor as specified in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that ninety (90) percent of the Accepted Contract Amount, less provisional sums, has been certified for payment, or on the _____ day of___, 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 of the advance payment as specified in the Contract.*

[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.*

FORM NO 8: 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]* (hereinafter called "the Contractor") has entered into Contract No. _____*[insert reference number of the contract]* dated_____with the Beneficiary, for the execution of_____*[insert name of contract and brief description of* Works*]* (hereinafter called "the Contract").

2. Furthermore, we understand that, according to the conditions of the Contract, the Beneficiary retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when the Taking-Over Certificate has been issued under the Contract and the first half of the Retention Money has been certified for payment, and payment of *[*insert the second half of the Retention Money] is to be made against a Retention Money guarantee.

3. At the request of the Contractor, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]*____(*[insert amount in words*_____*])*[1] upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.

4. A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the second half of the Retention Money as referred to above has been credited to the Contractor on its account number__at_____*[insert name and address of Applicant's bank]*.

5. This guarantee shall expire no later than the …..... Day of ….....……, 2.....…[2], and any demand for payment under it must be received by us at the office indicated above on or before that date.

6. The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed *[six months] [one year],* in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.

[Name of Authorized Official, signature(s) and seals/stamps]

Note: All italicized text (including 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 second half of the Retention Money.*

[2] *Insert a date that is twenty-eight days 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.*

FORM NO 9: BENEFICIAL OWNERSHIP DISCLOSURE FORM

(Amended and issued pursuant to PPRA CIRCULAR No. 02/2022)

INSTRUCTIONS TO TENDERERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE FORM

This Beneficial Ownership Disclosure Form ("Form") is to be completed by the successful tenderer pursuant to Regulation 13 (2A) and 13 (6) of the Companies (Beneficial Ownership Information) Regulations, 2020. In case of joint venture, the tenderer must submit a separate Form for each member. The beneficial ownership information to be submitted in this Form shall be current as of the date of its submission.

For the purposes of this Form, a Beneficial Owner of a Tenderer is any natural person who ultimately owns or controls the legal person (tenderer) or arrangements or a natural person on whose behalf a transaction is conducted, and includes those persons who exercise ultimate effective control over a legal person (Tenderer) or arrangement.

Tender Reference No.:_____[*insert identification no*] Name of the Tender Title/Description:_____*[insert name of the assignment]* to:_____*[insert complete name of Procuring Entity]*

In response to the requirement in your notification of award dated_*[insert date of notification of award]* to furnish additional information on beneficial ownership:_____*[select one option as applicable and delete the options that are not applicable]*

I)We here by provide the following beneficial ownership information.

Details of beneficial ownership

	Details of all Beneficial Owners		**% of shares a person holds in the company Directly or indirectly**	**% of voting rights a person holds in the company**	**Whether a person directly or indirectly holds a right to appoint or remove a member of the board of directors of the company or an equivalent governing body of the Tenderer** (Yes / No)	**Whether a person directly or indirectly exercises significant influence or control over the Company (tenderer) (Yes / No)**
	Full Name		Directly----------% of shares Indirectly----------%	Directly ……. % of voting rights Indirectly----------% of voting rights	1.Having the right to appoint a majority of the board of the directors or an equivalent governing body of the Tenderer: Yes -----No---- 2.Is this right held directly or indirectly?	1.Exercises significant influence or control over the Company body of the Company (tenderer) Yes -----No----
	National identity card number or Passport number					
	Personal Identification Number (where applicable)					

	Details of all Beneficial Owners		**% of shares a person holds in the company Directly or indirectly**	**% of voting rights a person holds in the company**	**Whether a person directly or indirectly holds a right to appoint or remove a member of the board of directors of the company or an equivalent governing body of the Tenderer** (Yes / No)	**Whether a person directly or indirectly exercises significant influence or control over the Company (tenderer) (Yes / No)**
	Nationality		- % of shares		Direct…… …… Indirect…… ……...	2.Is this influence or control exercised directly or indirectly? Direct…… ……. Indirect…… ……
	Date of birth *[dd/mm/ivy]*					
	Postal address					
	Residential address					
	Telephone number					
	Email address					
	Occupation or profession					
	Full Name		Directly---------- % of shares Indirectly---------- % of shares	Directly …… …. % of voting rights Indirectly---------% of voting rights	1.Having the right to appoint a majority of the board of the directors or an equivalent governing body of the Tenderer: Yes -----No---- 2.Is this right held directly or indirectly? Direct…… …… Indirect…… ……...	1.Exercises significant influence or control over the Company body of the Company (tenderer) Yes ----- No---- 2.Is this influence or control exercised directly or indirectly? Direct…… ……. Indirect……
	National identity card number or Passport number					
	Personal Identification Number (where applicable)					
	Nationality (ies)					
	Date of birth *[dd/mm/ivy]*					
	Postal address					
	Residential address					

	Details of all Beneficial Owners		**% of shares a person holds in the company Directly or indirectly**	**% of voting rights a person holds in the company**	**Whether a person directly or indirectly holds a right to appoint or remove a member of the board of directors of the company or an equivalent governing body of the Tenderer** (Yes / No)	**Whether a person directly or indirectly exercises significant influence or control over the Company (tenderer) (Yes / No)**
	Telephone number					……
	Email address					
	Occupation or profession					

II) Am fully aware that beneficial ownership information above shall be reported to the Public Procurement Regulatory Authority together with other details in relation to contract awards and shall be maintained in the Government Portal, published and made publicly available pursuant to Regulation 13(5) of the Companies (Beneficial Ownership Information) Regulations, 2020.(Notwithstanding this paragraph Personally Identifiable Information in line with the Data Protection Act shall not be published or made public). *Note that Personally Identifiable Information (PII) is defined as any information that can be used to distinguish one person from another and can be used to DE anonymize previously anonymous data. This information includes National identity card number or Passport number, Personal Identification Number, Date of birth, Residential address, email address and Telephone number.*

III) In determining who meets the threshold of who a beneficial owner is, the Tenderer must consider a natural person who in relation to the company:

(a) holds at least ten percent of the issued shares in the company either directly or indirectly;

(b) exercises at least ten percent of the voting rights in the company either directly or indirectly;

(c) holds a right, directly or indirectly, to appoint or remove a director of the company; or

(d) exercises significant influence or control, directly or indirectly, over the company.

IV) What is stated to herein above is true to the best of my knowledge, information and belief.

Name of the Tenderer: .....[insert complete name of the Tenderer]*_____

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

Designation of the person signing the Tender: ..... [insert complete title of the person signing the Tender]

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

Date this ..... [insert date of signing] day of..... [Insert month], [insert year]

Bidder Official Stamp